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Jan-Nov

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12

JANUARY, 1923

No. 1

ENTRIES 1-932

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 136, 139, 179, 203, 210, 217, 285, 286, 301, 348, 409, 422, 482, 525, 664, 687, 698, 721, 762, 763, 766, 793, 815, 829, 836, 849, 852, 866, 878, 881, 888)

1. ANONYMOUS. Cycles in yield of crops. *Nature* 109: 261-262. 1922.—Editorial comment is made on publications by H. L. Moore and by Sir William Beveridge.—*O. A. Stevens.*

2. ANONYMOUS. El cultivo del arroz. [Rice culture.] *Rev. Soc. Rural Cordoba [Argentina]* 21: 5701-5709. 1921.—Rice culture is discussed including history, cultivation, varieties, and uses.—*John A. Stevenson.*

3. ANONYMOUS. El cultivo del lino. [Flax culture.] *Jalisco Rural [Mexico]* 4: 715-721. 5 fig. 1922.—The article recommends flax growing for Mexico and gives cultural directions.—*John A. Stevenson.*

4. ANONYMOUS. International potato conference. *Gard. Chron.* 70: 280-281. 1921.—In this conference, held at London, November 16, 17, and 18, the 1st session was devoted to breeding and selection. At subsequent sessions there were addresses on early history, industrial and commercial uses, degeneration, life history of wart disease organism, immunity, blight, and miscellaneous diseases of the potato. The papers and discussion are to be published in an official report. [See also *Bot. Absts.* 11, Entries 2849, 2853, 2889, 2899, 2916, 2920, 2922, 2923, 2960.]—*P. L. Ricker.*

5. ANONYMOUS. Main crop potatoes at Wisley 1921. *Jour. Roy. Hort. Soc.* 47: 90-94. 1922.—Eighty-five stocks of potatoes were grown. The awards of the committee are listed. A classified list of varieties with descriptions and notes is given.—*J. K. Shaw.*

6. ANONYMOUS. Phosphorsäuredüngung und Beschaffung. [Fertilizing with and securing phosphoric acid. *Mitteil. Deutsch. Landw. Ges.* 37: 395-402. 1922.—A discussion, led by GERLACH, is reported regarding the extent to which the use of phosphoric acid may be temporarily dispensed with and sources of supply.—*A. J. Pieters.*

7. ANONYMOUS. The 1920 wheat, oats and corn yields from soil experiment fields in Illinois. Illinois Agric. Exp. Sta. Circ. 246. 4 p. 1921.—The report covers results from a number of the University of Illinois soil experiment fields located in different parts of the state.—*Mary R. Burr.*

8. ANONYMOUS. Work of sugar experiment stations. Bundaberg field day. Australian Sugar Jour. 14: 140-141, 147-149. Fig. 2-5. 1922.—A brief description is given of the best of the varieties of sugar cane and of cane seedlings which are being tested at the farm. Shahjahanpur No. 10 is proving to be frost resistant. This Indian variety is thin in stalk but has been increasing in diameter since it has been growing in Queensland.—*C. Rumbold.*

9. ALMADA, PONCIANO R. El cultivo de la caña de azucar. [The cultivation of sugar cane.] Jalisco Rural [Mexico] 3: 281-284. 1920.—Popular.—*John A. Stevenson.*

10. ANDERSON, H. Aim and purpose of federal grain standards. Rept. Maryland Agric. Soc. 6: 240-242. 1921 [1922].—Federal grain standards have proved advantageous in marketing wheat. With definite standards, the prices paid to farmers are consistent with prices quoted at the nearest terminal markets. Certain tests perfected by the U. S. Department of Agriculture safeguard wheat shipments.—*A. Lee Schrader.*

11. AYRES, W. E. Cotton experiments 1921. Mississippi Agric. Exp. Sta. Circ. 42. 8 p., 2 fig. 1921.—The results of variety tests, spacing, and breeding are given with discussions on topping and time for thinning cotton.—*J. Fred O'Kelly.*

12. B[ARBER], G. A. The classification of sugar cane varieties. [Rev. of: EARLE, F. A. Sugar cane varieties of Porto Rico. II. Jour. Dept. Agric. Porto Rico 5³: 1921 (1922).] Internat. Sugar Jour. 24: 350-353. 1922.—The second review of this paper.—*C. Rumbold.*

13. B[ARBER], C. A. Recent work in cane agriculture. [Rev. of: Review of agricultural operations in India 1920-1921. Sugar cane. 9-14. Superintendent of Government Printing Calcutta, 1922.] Internat. Sugar Jour. 24: 361-362. 1922.—Promising results are being obtained with seedlings raised at the Coimbatore farm, especially those obtained by crossing thick canes with *Saccharum spontaneum*, a natural grass. Hybrids having the deep-rooting character of the wild grass and the sucrose content of the cane have proved suitable for North Bihar and parts of the Punjab. In the United Provinces M16 and J247 are suitable for intensive cultivation. In Bengal, Yellow Tanna proved good. In the Punjab, Saretha was best in the Canal Colonies and Bihar. Co205 headed the best at Gurdaspur farm. In Assam, Striped Mauritius, B147, B376, and J33a were distributed; of new varieties Co9 and D74 were the most promising. In the Central Provinces, Khari is replacing the local Katai and Kala and some of the Coimbatore seedlings are promising. In Burma, cane cultivation is increasing and the following varieties, introduced from Coimbatore, are successful:—Ashy Mauritius, B147, J247, and Gilman. In Mysore, seedling work is continuing, and 2 seedlings are mentioned as superior to Red Mauritius, which exceeds the output of the local cane, Pattapatti, by 25 per cent.—*C. Rumbold.*

14. BARTLETT, H. Farmers' experiment plots. Maize experiments, 1921-22. Western district. Agric. Gaz. New South Wales 33: 409-410. 1922.—Seed was sown in drills 6 feet apart with 3 grains every 3 feet in the drills. The highest yield of 35 bushels per acre was secured from Funk's Yellow Dent and the lowest yield, 17 bushels per acre, from North West Dent. The variety U. S. 133 had a stalk height of but 4 feet and yielded 34 bushels.—*L. R. Waldron.*

15. BASU, S. K. Green-manuring of broadcasted paddy in Orissa. Agric. Jour. India 16: 689-690. 1921.—Seeds of dhaincha (*Sesbania aculeata*) and paddy are sown together in the proportion by weight of 1 of dhaincha to 6 of paddy. A month or 6 weeks later the fields are

ploughed, the green manure crop (and most of the rice seedlings) being destroyed and buried and serving as manure for the surviving rice plants. Field trials showed an increase in yield of 290 pounds of paddy as a result of this method.—*A. Howard*.

16. BASU, S. K. The possibilities of rabi crops in Orissa. *Agric. Jour. India* 17: 92-94. 1922.—The frequent destruction by floods of the paddy crop over large areas in Orissa has led to experiments to find the best means of utilizing such areas during the succeeding cold weather. Good yields of wheat, barley, oats, gram, and peas were obtained.—*A. Howard*.

17. BAUR, C. Ist der Hafer mit sich selbst verträglich? [Should oats follow oats in crop rotation?] *Illustr. Landw. Zeitg.* 42: 115-116. 1922.—Experiments are reported which show that land planted in oats is unfavorable to oats for at least 3 years thereafter. As possible causes, "soil exhaustion," lack of calcium, toxic root excretions, and insect pests are discussed.—*John W. Roberts*.

18. BLAKELY, W. F. Another pest for wool-growers. *Agric. Gaz. New South Wales* 33: 447. 1922.—Attention is called to the recent introduction of *Cenchrus pauciflorus* into New South Wales.—*L. R. Waldron*.

19. BREAKWELL, E. The medics or burr trefoils. *Agric. Gaz. New South Wales* 33: 418-426. 2 fig. 1922.—An analytical key and descriptions are given of various species, including *Medicago lupulina*, *M. denticulata*, *M. minima*, *M. laciniata*, *M. maculata*, *M. truncatula*, *M. orbicularis*, *M. scutellata*, *M. reticulata*, and *M. tuberculata*. Three species of crow foot of economical value, *Erodium cygnorum*, *E. moschatum*, and *E. cicutarium*, are described.—*L. R. Waldron*.

20. BUIE, T. S. Cotton varieties. *Georgia Agric. Exp. Sta. Bull.* 136. 10 p. 1920.—Twenty-five varieties of cotton (*Gossypium herbaceum*) were tested. Histories of these varieties are given as well as cultural directions for use under boll weevil conditions.—*T. H. McHatton*.

21. BURT, B. C., and R. S. FINLOW. Some preliminary experiments with jute in the United Provinces. *Agric. Jour. India* 16: 618-625. 1921.—Trials show that on suitably selected land marketable jute can be grown profitably on the low-lying areas near the Sarda and Gogra rivers. Successful introduction of the crop depends largely on whether local cultivators can be persuaded to pay sufficient attention to proper cultivation and to retting.—*A. Howard*.

22. BUSSE, W. Ertragssteigerung bei Flachs durch Klimawechsel. [Increased yield of flax by change of climate.] [Rev. of: Commerce report of the Netherlands Government 9: 782.] *Mitteil. Deutsch. Landw. Ges.* 37: 386. 1922.—Flax seed of Irish growth was sent to Holland, France and Canada; seed was produced and returned to Ireland. The yield from the foreign raised seed of Irish origin was better than that from Irish grown seed.—*A. J. Pieters*.

23. C[ANADIAN] S[OCIETY OF] T[ECHNICAL] A[GRICULTURISTS] COMMITTEE ON RESEARCH. Agricultural research in Canada. *Sci. Agric.* 3: 3-17. 1922.—A list is presented of possible problems, including 53 in agronomy, 62 in botany and plant pathology, and 15 in horticulture.—*B. T. Dickson*.

24. CHILDS, R. R. A cotton production program. *Georgia State Coll. Agric. Bull.* 229. 12 p., 3 fig. 1921.—General information and instructions are presented to the farmers of Georgia in an effort to overcome the low price of cotton and boll weevil injury; suggested rotations are given, varieties recommended, and plans outlined for poisoning and controlling the weevil.—*T. H. McHatton*.

25. CHILDS, R. R. **College No. 1 cotton.** Georgia State Coll. Agric. Bull. 226. 8 p., 3 fig. 1921.—College No. 1 cotton is a new early variety of big boll cotton (*Gossypium herbaceum* L.) developed at the Georgia State College of Agriculture to meet the demands in the fight against the boll weevil. The variety originated as a selection from Sunbeam, the original work being done by R. J. H. DeLoach and the final selection being made by L. E. Rast in 1912. The variety comes from a single plant and the plant-to-the-row method has been followed in developing it. The variety is of vigorous growth with few vegetative branches; it is an early yielder and has averaged 885 pounds of lint cotton per acre in the experimental plats since 1914.—T. H. McHatton.

26. CHILDS, R. R. **Cotton production and boll weevil control.** Georgia State Coll. Agric. Bull. 238. 28 p., 15 fig. 1921.—The recommendations for cotton production under boll-weevil conditions include the production of home supplies, early planting and good care of the crop, and the use of calcium arsenate against the weevil.—T. H. McHatton.

27. CHILDS, R. R. **Seed selection on the farm.** Georgia State Coll. Agric. Bull. 241. 16 p., 9 fig. 1921.—Diagrams of seed plats and directions for selecting and improving various farm crops are given.—T. H. McHatton.

28. CLARK, S. P. **Rhodes grass in Arizona.** Arizona Agric. Exp. Sta. Circ. 36. 3 p. 1921.—Rhodes grass is valuable for pasture and hay fields on very alkaline soil. It withstands drought fairly well but a temperature below 15°F. is usually fatal. The average yield is 3-6 tons per acre.—Herbert C. Hanson.

29. CROSS, W. E. **Distancia a que se debe plantar la caña de azucar.** [Distance for planting sugar cane.] Rev. Indust. y Agric. Tucuman 11: 113-118. 1921.—Work to ascertain the best distance between rows of cane was begun in 1915 and carried on in 1920. The varieties used were P.O.J. 36, P.O.J. 213, Kavangire, and Zwinga. Plantings were made at distances of from 0.9 to 2.4 m., practically identical yields being obtained from all. The closer the rows, the more numerous but smaller in diameter were the stalks. The distance recommended for Tucuman depends upon the cultural methods employed. With hand work 2.4 m. is most economical, with machinery 1.8 or 2.0 m. Closely spaced rows with more stalks per row are more expensive to plant, cultivate, and harvest.—John A. Stevenson.

30. CROSS, W. E. **Estudios de la caña dejada dos años en pie.** [Studies of cane left standing two years.] Rev. Indust. y Agric. Tucuman 11: 85-99. 1920.—The 1919 cane crop of Tucuman was too large to harvest during the grinding season. The planters were confronted with the problem of cutting and burning the unharvested cane to permit a ratoon crop, or to risk souring and rotting of the cane if left over until the following season. Experimental studies were made with certain of the Javan seedling varieties and Kavangire. Under usual conditions it was found to be satisfactory to leave cane uncut until the 2nd year. Such cane contained more fiber than 1-year old cane and there was a slightly lower extraction. No difficulties were experienced with the juice in the mill. The cane should be worked up as soon as possible after cutting.—John A. Stevenson.

31. CROSS, W. E. **Las posibilidades de las cañas de Java en Luisiana.** [Possibilities of the Javan canes in Louisiana.] Rev. Indust. y Agric. Tucuman 11: 118-121. 1921.—The P.O.J. seedlings developed in Java are hybrids between the hardy Indian canes native of subtropical regions and the large tropical non-hardy Javan types. They are resistant to disease, cold, and other unfavorable conditions. Their introduction met the situation in Argentina when the native varieties failed. They are recommended for Louisiana where the cane growers are attempting to grow tropical varieties under subtropical conditions. The Javan canes are very resistant to the mosaic disease, and the author recommends their introduction even though they may carry the disease.—John A. Stevenson.

32. CROSS, W. E. Nuevos estudios sobre las cañas tucumanas de semillero. [New studies with Tucuman seedling canes.] Rev. Indust. y Agric. Tucuman 11: 57-62. 1920.—A continuation of work previously reported upon [Ibid. 9: 161-167] involving the 1919 seedlings (first ratoons) and 1920 seedlings. Determinations of Brix, sucrose, purity, glucose, and yield were made. Low-yielding varieties or those poor in sucrose were discarded. Observations as to relative resistance to freezing are also recorded.—*John A. Stevenson.*

33. CROSS, W. E. Un ejemplo de la resistencia de la caña de Java a las heladas. [An example of the resistance of the Javan canes to freezing.] Rev. Indust. y Agric. Tucuman 11: 103-105. 1921.—Sugar cane in Tucuman was subjected to 5 days of freezing weather in July. Native varieties spoiled very quickly but the Javan varieties P.O.J. 36, 213, 228, and 234, and Kavangire stood up well through September and October. Chemical tests showed a falling off in sucrose and purity with an increase in glucose content during November and December.—*John A. Stevenson.*

34. CULLARE, JAUME. El conreu de l'alfals. [Alfalfa culture.] Rev. Inst. Agric. Catalan de San Isidro 70: 45-47, 139-141, 153-156. 1921.—Popular.—*John A. Stevenson.*

35. CUNNINGHAM, W. S. Sudan grass versus alfalfa hay for dairy cows. Arizona Agric. Exp. Sta. Timely Hints for Farmers 139. 4 p. 1922.—The results of a single feeding experiment show that alfalfa produced more milk than did Sudan grass.—*Herbert C. Hanson.*

36. DAWE, M. T. Arghan—the mysterious fibre which hails from the unknown. Tropic. Life 18: 86. 1922.—The author reports the organization of an Arghan Company “for the purpose of obtaining supplies of Arghan plants from their native habitat in the wilds and transplanting these into organized areas in British Dominions in the East.” Dawe says that merchants who have received samples of Arghan fibre are unable to distinguish it from the Columbian pita fiber believed by botanists to be the product of *Ananas macrodontes* Morren, and a closely allied species or variety [see Bot. Absts. 8, Entry 1593]. It is intimated that the name Arghan is a camouflage intended to divert the hunt for this plant from South and Central America to the region of the Arghandab River in Afghanistan, and the author proposes 3 questions designed to bring out the truth in regard to Arghan.—*H. N. Vinall.*

37. DOBBS, A. C. The improvement of agriculture in Bihar. Agric. Jour. India 16: 138-141. 1921.—The author advocates the study of agriculture by Bihari students.—*A. Howard.*

38. EASTERBY, H. T. Sugar experiment bureau. Summary of 21 years' work. Australian Sugar Jour. 14: 284-286. 1922.—This 3rd paper gives a summary of fertilizer experiments with plant and ratoon crops of cane.—*C. Rumbold.*

39. ESTRADA, MARIO. Utilidad de las leguminosas en la agricultura. [Value of the legumes in agriculture.] Rev. Soc. Rural Cordoba [Argentina] 21: 5717-5728. 1921.—The value of leguminous plants as forage crops and nitrogen gatherers is discussed.—*John A. Stevenson.*

40. FAIN, JOHN R. Alfalfa for Georgia. Georgia State Coll. Agric. Bull. 217. 12 p. 1920.—Types of alfalfa (*Medicago sativa* L.), also soils, preparation of land, fertilizers, seeding, cultivation, cutting, as well as uses of this crop are discussed.—*T. H. McHatton.*

41. FAIN, JOHN R., and PAUL TABOR. Hay crops for Georgia. Georgia State Coll. Agric. Bull. 237. 20 p., 17 fig. 1921.—A general discussion is presented of 30 hay and forage crops adapted to Georgia with outline maps designating the sections especially suitable to the various plants.—*T. H. McHatton.*

42. FAULKNER, O. T. Tests of Punjab wheats Nos. 11 and 8A at Lyallpur 1915-20. *Agric. Jour. India* 16: 508-518. 1921.—These 2 varieties have been compared for 5 years on 170 pairs of plots and found to be very similar in yielding power. From the miller's point of view, Punjab 11 is considered preferable.—A. Howard.

43. FERRIS, E. B. Peanuts. *Mississippi Agric. Exp. Sta. Bull.* 208. 14 p. 1922.—This is a revision of Bull. 130. Varieties are described and the "White Spanish" is given as the best for south Mississippi. Soil requirements, preparation of land, fertilizers, cultivation, harvesting, yields, value as soil builders, and uses are discussed somewhat in detail. Tables are given comparing the feeding value of peanut hay with other hay crops, average composition of the food and fertilizing constituents in different parts of the plant.—J. Fred O'Kelly.

44. FINLOW, R. S. Historical note on experiments with jute in Bengal. *Agric. Jour. India* 16: 265-279. 1921.—A short chronological account is given of the investigations on jute (*Corchorus capsularis* and *C. olitorius*) in Bengal since 1904. Various races have been isolated by selection which yield more than the ordinary crop. Kakya Bombai, a strain of *C. capsularis*, outyields local races about 250 pounds of fiber per acre. Chinsurah green, a selection from *C. olitorius*, has also given good results under experimental farm conditions.—A. Howard.

45. GAVILÁN, JUAN. Nuevos metodos de cultivo de cereales en secano. [New methods of cultivating cereals under "dry-land" conditions.] *Información Agric.* [Madrid] 12: 97-100. 3 fig. 1922.—Greatly increased yields have been obtained by the use of machinery in cereal cultivation in Spain. This has made it possible to raise within the country a larger percentage of its necessary breadstuffs.—John A. Stevenson.

46. GUZMANES, ANTONIO. Fertilización de la remolacha azucarera, patatas, y maíz. [Fertilization of the sugar beet, the potato, and corn.] *Información Agric.* [Madrid] 12: 108-109. 2 fig. 1922.—Directions for fertilizers to secure maximum yields are given.—John A. Stevenson.

47. HANMANTE, N. V. Experience of prickly pear as an emergency cattle food. *Agric. Jour. India* 17: 389-391. 1922.—During the famine of 1920-21 demonstrations of the value of prickly pear as a fodder for work cattle were carried out in the Ahmedabad District in Bombay. Over 1,500 starving cattle were fed with prickly pear from which the thorns were previously removed by burning and to which 2 pounds of cotton seed and 2-3 pounds of dry grass for each animal were added. There was a rapid improvement on this diet and after 2 months the animals became vigorous.—A. Howard.

48. HANSEN, ALBERT A. Austrian field cress: A new weed in the United States. *Torreyia* 22: 73-77. Fig. 1. 1922.—In June 1921 *Roripa austriaca* Spach was found overrunning certain sections of Borderland Farm, New Milford, Orange County, New York. The plant was first introduced about 1910 in impure grass-seed and has spread by means of creeping roots until about 7 acres have become infested. It threatens to become a dangerous pest, and radical measures should be taken before it gets beyond control. It could probably be exterminated by spraying with iron or copper sulphate. Great loss can be prevented at very small cost if prompt action is taken.—J. C. Nelson.

49. HARSNBOWER, A. C. La alfalfa. *Bol. Camara Agric. Costa Rica* 1: 271-276. 1921.—Popular.—John A. Stevenson.

50. HAWKINS, R. S. Sudan grass in Arizona. *Arizona Agric. Exp. Sta. Circ.* 35. 5 p. 1921.—The author gives directions regarding the growing, harvesting, and uses of Sudan grass.—Herbert C. Hanson.

51. HENDERSON, J. W. Garlicky wheat. *Rept. Maryland Agric. Soc.* 6: 242-249. 1921 [1922].—Analyses of 462 samples of wheat secured in 21 out of 23 counties of Maryland show

that Maryland wheat is "garlicky" almost without exception. The presence of garlic bulbs in the wheat of 1921 caused an estimated loss of \$421,300 to the producer.—A. Lee Schrader.

52. ISHAQ, A. R. Rice cultivation in the Larkhana district, Sind (India). Bombay Presidency Dept. Agric. Bull. 99. 38 p., 1 map. 1920.—A preliminary study is reported of the Larkhana district, lying west of the Indus River. Soils, climate, and irrigation are briefly treated.—The cultivation of rice, of which 11 varieties are recognized by the trade, is discussed at length. Pests are not serious. Wheat or legumes frequently follow rice the same year.—Share land tenure, high land values, and scarcity of labor help to make the economic condition of the cultivators relatively good.—Robert L. Pendleton.

53. ITIÉ, GABRIEL. El cultivo del algodón en la comarca lagunera. [Cotton culture in the Laguna district.] Rev. Agric. [Mexico] 6: 255-262. 5 fig. 1921.—The article deals with the history and methods of cotton culture in the Laguna district of Mexico,—John A. Stevenson.

54. ITIÉ, GABRIEL. Una hierba dañina—el cardo. [The thistle, an injurious weed.] Rev. Agric. [Mexico] 7: 90-92. 3 fig. 1922.—The article concerns *Carduus* sp.—John A. Stevenson.

55. KELLOG, C. E. Feeding sorghum pomace as silage to cattle. Georgia State Coll. Agric. Bull. 221. 12 p., 3 fig. 1921.—Sorghum (*Sorghum vulgare* Pers. var. *saccharatum*) pomace makes good silage. Analysis yields the following percentages: water 73.5, ash 1.08, crude protein 1.14, crude fiber 7.82, nitrogen-free extract 14.74, and crude fat 0.66; it compares well with other silages and gave an average daily gain of 2.11 pounds on 80 steers averaging 840 pounds per head during a feeding period of 105.5 days. The ration used consisted of 36 pounds of sorghum pomace silage, 6.07 pounds of cotton seed meal, 5.4 pounds of cotton seed hulls, and a very small amount of molasses.—T. H. McHatton.

56. KENOYER, L. A. Retarded development of temperate cereal varieties under tropical conditions. Agric. Jour. India 16: 454-457. 1 fig. 1921.—Kanred wheat from Kansas grown at Allahabad, India, by the side of Pusa 12 remained in the vegetative state until harvest and then made feeble culms with small, badly-filled ears towards the end of the hot season.—A. Howard.

57. KERLE, W. D. Farmers' experiment plots. Potato experiments 1921-22. Upper north coast district. Agric. Gaz. New South Wales 33: 381-390. 3 fig. 1922.—Experiments were undertaken in cooperation with 8 farmers. Eighteen varieties of potatoes were under trial, including well known varieties such as Scottish Triumph, Satisfaction, Factor, Up-to-date, Early Rose, Carman No. 1, and Early Manistee. The maximum yield of 315 bushels per acre was secured from Early Manistee grown at Condong on the Tweed River. Scottish Triumph, Early Manistee, and Early Manhattan were among the higher yielding sorts. The crop was injured on some farms by late blight caused by *Phytophthora infestans*. In the manual trials a complete fertilizer gave highest yields. Trials were made with various sized seed tubers planted at different rates.—L. R. Waldron.

58. KIRJASSOFF, ALICE BALLANTINE. Formosa the beautiful. Nation. Geog. Mag. 37: 247-292. 69 fig. 1920.—Details are given of the production of tea and camphor.—W. M. Atwood.

59. KNIGHT, J. B. Prickly pear as a cattle food. Bombay Presidency Dept. Agric. Bull. 97. 63 p., 18 pl. 1920.—The prickly pear (*Opuntia elatior* Mill.) was introduced into India about 1800 A.D., and is now quite common as a weed in many parts of the Bombay Presidency. During various famines it has been tried as a cattle feed, but not until 1918-19 was it used on a large scale.—The author describes in detail the feed value of the plant, showing

that it contains a high percentage of water and is low in protein. This necessitates the feeding with it of concentrated feedstuffs. Methods of removing the spines mechanically and by means of burning with gasoline torches and blacksmiths' forges, and the relative merits of the various processes are described. Full instructions are given for operating large famine camps for saving cattle. It is believed that thornless cactus may become an important fodder reserve for adverse years.—A bibliography of 26 titles is given.—*Robert L. Pendleton.*

60. KOESLAG, J. D. *De pootgoedverwisselingsproeven met Eigenheimers van het Centraal Comité in 1920 en 1921.* [Exchange of seed experiments with Eigenheimer seed potatoes by the Central Committee in 1920 and 1921.] *Cultura* 34: 94–108. 1922.—The object of the experiments is to ascertain whether the variety produces yields of different quality when grown for more than 1 year in the same section. Seed potatoes of the same origin were planted in different localities of the Netherlands. Diseases appeared sooner in some localities than in others. The experiments will be continued for several years.—*J. C. Th. Uphof.*

61. KOTTUR, G. L. An improved type of cotton for the Dharwar-American tract. *Agric. Jour. India* 17: 347–352. 1922.—For 6 years a selection from Dharwar-American cotton, known as Gadag 1, has given a better yield of lint and a higher ginning percentage than the ordinary crop.—*A. Howard.*

62. KULKARNI, L. B. A discovery: *Andropogon purpureosericeus* and its importance in the improvement of grazing areas in the Bombay Deccan. *Agric. Jour. India* 16: 388–395. *Pl. 22.* 1921.—This indigenous fodder grass is suitable for poor land, grows quickly, and yields up to 5,000 pounds of fresh produce useful for silage. It is somewhat drought resistant and suppresses *A. contortus*, the dominant species on most of the poor land of the Bombay Deccan. Both in the fresh condition and when dry it is preferred by cattle to *A. contortus*.—*A. Howard.*

63. LEAKE, H. MARTIN. The bases of agricultural practice and economics in the United Provinces, India. *viii + 27 p.* W. Heffer & Sons: Cambridge, 1921.—The book, based on lectures delivered to the students of Cawnpore Agricultural College, attempts to state the fundamental problems of agriculture in India and the lines along which improvement is to be sought. The scope of the book is indicated by the section headings: origin of agriculture; basis of agricultural practice (environmental conditions and plant growth); basis of agricultural economics (land, ownership, capital, production, and markets); development of agricultural practice (improvement of crops and of methods of cultivation); and development of agricultural economics (cooperative effort, the role of land-owner, government, and money-lender in agricultural improvement, and the cattle problem). [See also Bot. Absts. 11. Entry 6.]—*Winfield Dudgeon.*

64. LEIDNER, R. Vorschläge zur Vereinfachung der technischen Durchführung von Feldversuchen. [Proposals for simplifying the technic of field experiments.] *Landw. Jahrb.* 54: 283–288. 1919.—The author discusses methods designed to increase the accuracy of the results and to lessen the labor involved in harvesting and recording the yields of experiment plots.—*H. S. Reed.*

65. LEWIS, A. C. Cotton variety tests 1920. *Georgia State Bd. Entomol. Circ.* 35. 4 p. 1921.—For south Georgia, Lewis 63 and Council Toole are recommended where wilt occurs; for north Georgia, Wanamaker-Cleveland, Toole, Cook's Improved, and College No. 1 are recommended.—*T. H. McHatton.*

66. LEWIS, A. C., and C. A. McLENDON. Cotton variety tests 1919. *Georgia State Bd. Entomol. Circ.* 29. 10 p. 1920.—Variety tests were conducted in 7 counties of the state with the following varieties: Lewis 63, Council-Toole, Petty-Toole, Dixie Improved, Covington-Toole, DeSoto, Dixie Triumph (South Carolina), Toole (Toole), Cook's Improved, Cook 307-6, College No. 1, Cleveland (Wanamaker and other strains), King, Bank Account, Broadwell,

Trice, Simpkins, Hooper, Meadows, Half and Half, Dillon, Poulnot, Modella, Dix-Affi, Webber No. 49, Express, Big Boll Express, and Meade. In south Georgia Lewis 63 and Council-Toole gave best results and in east and north Georgia the Wanamaker-Cleveland headed the list.—*T. H. McHatton*.

67. LORENZETTA, JOSÉ R. El cuidado de los alfalfares. [Care of alfalfa fields.] Rev. Soc. Rural Cordoba [Argentina] 21: 5902-5911. 1921.—Methods of maintaining alfalfa fields are discussed.—*John A. Stevenson*.

68. McCAULEY, C., and L. J. GREEN. Oat variety trials, 1921. Cowra experiment farm. Agric. Gaz. New South Wales 33: 411-413. 1922.—In the early planting trial Fulghum yielded best at 58 bushels per acre while in the late planting trial it stood 2nd and Wilga, a new variety, 1st at 54 bushels. Brief notes are given on a similar trial at Yanco.—*L. R. Waldron*.

69. McDIARMID, R. W. Elephant grass (*Pennisetum purpureum*) at Coonamble experiment farm. Agric. Gaz. New South Wales 33: 431. 1922.—Under irrigation Elephant grass did remarkably well.—*L. R. Waldron*.

70. McLEAN, K. Water hyacinth. A serious pest in Bengal. Agric. Jour. India 17: 23-40. Pl. 2-3. 1922.—The water hyacinth (*Eichornia crassipes*), first noticed in Bengal about 1898, has now become a serious pest in the Gangetic delta where it interferes with navigation and the cultivation of deep-water rice. High floods in 1917 were followed by a check in the spread of the pest during 1918 and 1919. Since then it has spread rapidly, particularly in rivers and channels where the current is feeble. The plant reproduces itself vegetatively in Bengal and sets only a few seeds. These the author so far has failed to germinate. Operations against the spread of the weed consist in making the weed into manure and converting it into ash which is several times richer in potash than wood ashes. Attempts to extract potassium chloride from the ash proved a commercial failure. A committee has been formed by the Bengal Government to enquire into the spread of this pest in Bengal and to suggest measures for its eradication.—*A. Howard*.

71. MAJUMDAR, U. M. A comparative study of some agricultural aspects of Gujarat and the Deccan. Poona Agric. Coll. Mag. 12: 124-127. 1921.—A statistical comparison is presented of the total crop production, the yields of the various crops, and the total population-sustaining powers of the 2 districts.—*Robert L. Pendleton*.

72. MANN, H. H., S. D. NAGPURKAR, G. S. KULKARNI, R. S. KASARGODE, S. R. PARANJPYE, and B. M. JOSHI. Investigations on potato cultivation in western India. Bombay Presidency Dept. Agric. Bull. 102. ii + 142 p., 9 pl. 1920.—Descriptions are given of the methods of potato culture near Poona, Mahabaleshwar, and Dharwar. Crops are raised in the summer or rainy season, and in the winter season. The seed rate is about 1,200 pounds per acre. About 5 tons of farm yard manure per acre are applied annually. It would be profitable to reinforce this with ammonium sulphate, potassium sulphate, and superphosphate. The main variety grown is of Italian origin, as when transportation is normal the annual seed potato supply comes from Italy. There are 3 local varieties raised in the hills; the yields are good. English or Indian seed potatoes raised in the higher mountains are not at all suitable for western India. Difficulties of using local potatoes for seed are: serious infection and unsuitability of village storage conditions and methods.—Potato storage demands thorough aeration and a maximum temperature of not over 90°F. otherwise "black heart," a physiological disease, causes heavy to complete loss. Data are given of a chemical study of changes in the "black heart" or "heat rot" disease. Sacking in bags, placed on end and separated, decreases the loss. In extremely hot weather moist canvas must be hung in the doorways.—Other serious pests are the potato moth (*Phthorimea operculella*), ring disease, and tambara disease. Less serious diseases are caused by *Fusarium* spp., *Rhizoctonia* sp., *Spongospora* sp., the potato stem borer (*Leucinodes orbonalis*), and occasionally the potato eel worm. Against the potato moth, fumigation with

petrol in masonry chambers is followed by sacking to keep out moths. The ring disease is very severe, causing 20–60 per cent decrease in yield. Within 5 years the disease can be reduced in a given area to a 1 per cent incidence by rigorous selection of seed. Local pure seed supplies will have to be maintained.—Plans of an improved potato storage warehouse are given.—*Robert L. Pendleton.*

73. MILLIGAN, S. Improved field for agricultural investigations. *Agric. Jour. India* 16: 244–250. 1921.—The need is discussed of a special organization of investigation to make practical use of the results of research work on soil and crops.—*A. Howard.*

74. MITRA, S. K. A method of rice selection in Assam. *Agric. Jour. India* 17: 240–241. 1922.—Simple methods of selecting the best ears for seed as practised by the cultivators in Assam are described.—*A. Howard.*

75. MITSCHERLICH, E. ALFRED. Ein Beitrag zur Technik des Sortenanbauversuches. [A contribution to the technique of variety-testing experiments.] *Landw. Jahrb.* 57: 191–201. 1922.—The author has previously [*Ibid.* 54: 742–745] suggested a method whereby the largest experimental error due to the diversity of the soil is eliminated. By determining the amount

of seed to be used by the formula $s = \frac{K \cdot 100g}{G}$ in which s = quantity of seed per hectare, K ,

100 = weight of individual seed g , and G germination, it was found that the crop yield is a function of the amount of seed used. In cereals, the quantity of seed to be used is increased to 140 kgm. per hectare,—for winter barley, 160,—the distance of sowing depending, however, on the germination of the seed and weight of 1000 grains. When it is feared, however, that too thick sowing may bring about lodging, particularly on rich soils, the amount of seed may be reduced without committing a great error to 120 and 140 kgm. respectively. Potatoes are planted at a distance of 50 × 60 cm.—*Selman A. Waksman.*

76. MITSCHERLICH, E. ALFRED. Feldversuche mit Kartoffeln. [Potato field trials.] *Landw. Jahrb.* 54: 703–745. 1919.—The size of the experimental plots is one of the main factors to be determined. In one experiment 5 varieties were used and the plots were laid out in 4 sizes varying from 3.6 to 237.6 square m.; to overcome soil variability each plot was replicated 4 times. In another experiment fertilizers containing either 1, 2, or all 3 essential elements were applied. The method of laying out the plots was the same as for the other experiments, excepting a variation in the size of the plots from 7.2 to 259.2 square m. The data show that a 50 square m. plot is sufficient for potato experiments. The questions of proper spacing and the size of the seed pieces were also investigated. The general conclusion was reached, based on statistically treated data, that the best distance is 35 × 40 cm. for a seed piece weighing 65 gm.; for smaller seed pieces closer planting is advocated. It is pointed out that under different climatic and soil conditions entirely different results may be obtained. As part of these field trials an experiment was carried out in which various potassium salts were applied on a soil poor in potassium. The results with potassium were considered inconclusive, not only as to yield, but also as to the starch content and dry weight of the tubers harvested. In the Appendix an example of the application of Peters formula, $V = \pm 0.8453 \frac{\Sigma (+v)}{\sqrt{n(n-1)}}$ is given. By means of this method the probable error of a single plot was reduced.—*F. F. Halma.*

77. MORRILL, A. W. Corn as a trap crop for the cotton bollworm. *Arizona Agric. Exp. Sta. Circ.* 30. 10 p. 1920.—The growing of corn and cowpeas to serve as a trap crop for the cotton bollworm is advocated. Vacant spaces and ditch banks offer favorable locations for the crop.—*Herbert C. Hanson.*

78. MÜNTER, F. Zum Mais- und Sonnenblumenanbau. [Culture of maize and sunflowers.] *Mitteil. Deutsch. Landw. Ges.* 37: 266–268. 1922.—A brief account is given of trials at Halle with several American and European varieties of maize and sunflowers.—*A. J. Pieters.*

79. NELSON, JAMES C. A new weed from Oregon. *Torrey* 22: 86-88. 1922.—*Salvia Aethiopsis* L. was found in 1920 growing in great abundance in a field of alfalfa near Lakeview, Lake County, Oregon. It is spreading rapidly and threatens to become a dangerous pest. This plant was supposed by Linnaeus to be identical with the "Aethiopsis" cited by classical authors as a plant of medicinal value. It seems to have been imported in alfalfa seed from Russia.—J. C. Nelson.

80. NEUMANN, O. Die Wintergerste. Ihre Kultur und ihre Verwendungsmöglichkeiten. [Winter barley. Its cultivation and possible uses.] *Landw. Hefte* 48: 5-36. 1921.—The cultivation of winter barley increased in Germany during and since the war. This increase was stimulated by the great decrease in the importation of nitrogenous feeds. The present area is sustained by the limited importation due to low purchasing power of German money and the lack of cheap supplies in Russia. In 1919, 137,000 hectares were seeded to winter barley. The winter barleys commonly cultivated are mostly varieties of the 6-row winter form long cultivated in Europe. The culture of winter barley spread into Germany from Holland; this was accompanied by selection which increased winter hardiness. Winter barley has been found to have many advantages. It yields well, starts growth before spring weeds, distributes labor to greater advantage, ripens early and permits late summer crops to follow. Winter barley is seeded between the last of August and the middle of September after root crops, early peas, green fodder, winter rye, or winter barley. A number of local strains have been produced by various breeders. Winter barley as produced in Germany is suitable for feed, for distilling, and in limited quantities mixed with summer 2-row barley can be used in brewing.—H. V. Harlan.

81. NOLTE, O. Düngungsversuche mit verschiedenen Phosphorsäuredüngern zu Zuckerrüben. [Various forms of phosphoric acid as fertilizing materials for sugar beets.] *Illustr. Landw. Zeitg.* 41: 463-464. 1921.—Conclusions are given resulting from experiments in which equal amounts of phosphoric acids were used in the forms of superphosphate, Thomas slag, "Rhenania" phosphate, and bone meal. The highest sugar contents were obtained from plats treated with Thomas slag and "Rhenania" phosphate, but the acid phosphate also gave excellent results. The results from bone meal were comparatively poor.—John W. Roberts.

82. OPITZ. Über Getreidesaatenanerkennung [Certification of seed grain.] *Mittel. Deutsch. Landw. Ges.* 37: 402-404. 1922.—The author discusses the points to be considered in making a field inspection. Specific and varietal genuineness and purity, and presence of weeds and diseases are discussed in detail.—A. J. Pieters.

83. PARR, A. E., and PUTTOO LAL. A valuable cattle fodder. *Agric. Jour. India* 16: 206-208. 1921.—Feeding experiments with baisurai (*Pluchea lanceolata*), a common deep-rooting weed of the hot season in the Agra Division, mixed with dry millet stalks gave better results with work cattle than a ration of millet stalks alone. The utilization of this weed would help to solve the shortage of fodder in this tract.—A. Howard.

84. PATEL, M. L. The connection between seed weight and lint weight in cotton. *Agric. Jour. India* 17: 204-205. 1922.—As in other types of cotton, an increase in the weight of lint per seed involves an increase in the weight of the seed in the herbaceous cottons of Gujarat.—A. Howard.

85. PATIL, P. C. Summary of the work done on Jalgaon farm (Bombay Presidency, India). *Bombay Presidency Dept. Agric. Bull.* 108. 11 + 33 p. 1921.—Data are largely in tabular form, and conclusions are frequently not stated.—The farm was established for producing pure seed of *neglectum roseum* cotton in quantity for distribution.—Meteorological records are included. Rainfall influences crop growth more by its distribution than by its quantity.—The yields of all the important crops are increasing due to the use of modern methods. Valuable local manures are castor cake, sheep folding, and night soil; a practical method of applying

the last is described.—Some attention has been devoted to experiments on manuring, green manuring, rotations, hybrid and selected cottons, and variety trials. Peanuts proved of special value in the rotations.—*Robert L. Pendleton.*

86. PATTERSON, H. J. Lessons learned from twenty years of fertilizer tests. Rept. Maryland Agric. Soc. 5: 336-340. 1920 [1921].—This paper summarizes the effects of fertilizers on yield, quality, color, maturity, and abundance of weeds. The time and method of application are also discussed.—*A. Lee Schrader.*

87. PORTER, JOHN. The spraying of cornfield weeds with sulphate of ammonia. Jour. Ministry Agric. Great Britian 28: 1109-1116. 1922.—Preliminary trials in spraying grain fields with sulphate of ammonia for weed control gave satisfactory results with charlock (*Sinapis arvensis* L.), wild white mustard (*S. alba* L.), ivy leaved speedwell (*Veronica hederifolia* L.), and sheep's sorrel (*Rumex acetosella* L.). The chemical was only partially effective for corn, buttercups (*Ranunculus arvensis* L., *R. repens*, and *R. acris*), dandelion (*Taraxacum Dens-leonis* Desf.), broad dock (*Rumex obtusifolius* L.), and common field thistle (*Carduus arvensis* Curt.), and almost ineffective for black mustard (*Sinapis nigra* L.), black bindweed (*Polygonum convolvulus* L.), and milk or sow thistle (*Sonchus arvensis* L.).—The spray fluid consisted of 2 cwt. of sulphate of ammonia dissolved in water and made up to 60 gallons. The sulphate of ammonia is not as effective or reliable as copper sulphate though where it is effective it has the added advantage of greatly stimulating the growth of the cereal crop through its value as a fertilizer.—*M. B. McKay.*

88. REGEL, C. VON. Heuanalysen von der Halbinsel Kola. [Analyses of hay from the Kola peninsula.] Landw. Jahrb. 54: 277-281. 1919.—This paper gives the results of botanical analyses of 8 samples of hay collected from fertilized and unfertilized meadows at 2 stations within the Arctic Circle. On the fertilized meadows *Poa pratensis* was the dominant species while on only 1 of the unfertilized meadows was there any considerable amount of this grass. *Vicia cracca* occurring in 2 samples is the only legume reported.—*A. J. Pieters.*

89. RICHARDSEN, A. Fruchtfolgen und statischer Versuch in der akademischen Gutswirtschaft Dikopshof. [Rotations and statistical studies at the academic estate Dikopshof.] Landw. Jahrb. 53: 109-165. 1919.—A series of rotation and fertilizer experiments started in 1904 are reported. Various fields were laid out, different rotations being followed in each with and without stable manure and artificial fertilizers. The statistical study covers 1906-13 and consists of a detailed report with tables giving yields of sugar beets, rye, wheat, red clover, vetch, and oats, with and without nitrogen, phosphoric acid, potash, and lime.—*A. J. Pieters.*

90. RICHTHOVEN, VON. Saatkartoffelbeizung. [Treating seed potatoes.] Mitteil. Deutsch. Landw. Ges. 37: 386-387. 1922.—The author gives a preliminary report on an experiment in treating seed potatoes with "Uspulum." The treatment did not injure the seed potatoes and appeared to result in stronger initial growth.—*A. J. Pieters.*

91. ROEMER, THEODOR. Der Feldversuch. [The field experiment.] Arbeit. Deutsch. Landw. Ges. 302. 69 p. 1920.—A critical study is reported of plot experiments, including the various factors, methods, sources of error, size, position and shape of plots, and number of replications. BAULE adds a supplement in which he discusses mathematically the question of average or probable variation.—*A. J. Pieters.*

92. ROSS, H. Field experiments with wheat, 1921. Wagga experiment farm. Agric. Gaz. New South Wales 33: 403-408. 1922.—A number of new varieties of wheat were tested in comparison with a few standard varieties. Hard Federation outyielded most of the new varieties. The remaining trials included a test of wheat varieties for hay with and without fertilizers and similar trials with oats. Algerian oats gave the best results. Notes on a barley trial are given.—*L. R. Waldron.*

93. ROSS, H. A. The production and utilization of manure on Illinois dairy farms. Illinois Agric. Exp. Sta. Bull. 240. 473-489. Fig. 1-3. 1922.—The discussion of the amount of manure recovered per animal unit, possible rates of applying, methods of utilizing, seasonal applications, and labor cost of hauling is based on detailed cost-accounting investigations conducted 1912-1919 on 87 farms.—O. H. Sears.

94. SAILLARD, EMILE. La teneur en chlore de la betterave à sucre pendant la végétation. [The chlorine content of the sugar beet during vegetation.] Ann. Sci. Agron. Française et Étrangère 38: 152-157. 1921.—The possibility of using ammonium chloride, a by-product from the manufacture of sodium carbonate by the Solvay process, as a nitrogenous fertilizer in place of ammonium sulphate or nitrate raised a question as to the effect on the growth of the sugar beet and the extraction of sugar. Analyses are reported showing the water, nitrogen, ash, and chloride content of different parts of the beet at 5 periods of growth. The petioles together with the principal vein of the leaves are shown to contain most of the chlorine, and in all cases the chlorine content increases as the season progresses.—A. B. Beaumont.

95. SANYAL, P. B. The plant *Carica Papaya* and its enzyme. Agric. Jour. India 16: 496-507. 1921.—The yield of crude papain during the rains at Pusa was 16-18 per cent of the juice. The sample contained a globulin, an albumin, albumoses in considerable quantity, and a milk-curdling ferment. The method of preparing the pure product from the latex is described.—A. Howard.

96. SARABIA, G.M.O. Elección de semilla de alfalfa. [Selection of alfalfa seed.] Bol. Soc. Agric. Norte [Chile] 11: 61-63. 1921.—Methods are outlined for selecting alfalfa seed to insure best yields.—John A. Stevenson.

97. SCHULTZ, E. F. La alfalfa comun y los tipos invernizos de alfalfa en Tucuman. [Common alfalfa and the winter types of alfalfa in Tucuman.] Rev. Indust. y Agric. Tucuman 12: 17-32. 4 fig. 1921.—The author stresses the importance of alfalfa as the standard forage crop of Tucuman. Alfalfa in Tucuman should be planted during the period March to May, when there is sufficient moisture for germination. The soil should be well prepared and inoculation with soil from an old field is desirable in new fields. Other crops should not be interplanted. *Cuscuta*, a bad pest, can be exterminated by cutting the crop on a hot day and removing the hay from the field. Alfalfa is of particular value in rotation with sugar cane. Since rain makes hay making difficult much of the time, the use of silos, either of the stack or pit type, is recommended. Peruvian is the best variety yet tried but export of the seed has been forbidden by the Peruvian government. A local strain, known as No. 3, has been developed in consequence and has all the advantages of the Peruvian.—John A. Stevenson.

98. SCHULTZ, E. F. La "Phalaris bulbosa" en la provincia de Tucuman. [Phalaris bulbosa in the province of Tucuman.] Rev. Indust. y Agric. Tucuman 11: 63-74. 9 fig. 1921.—*Phalaris bulbosa* has been extensively studied in Argentina, including 5 years' experimental work at the Tucuman experiment station. The grass does not compare in value with Peruvian alfalfa as a forage crop, the latter giving yields 2-4 times greater. When propagated by seed it is easily overrun by weeds, due to poor germination; and when propagated by division the cost is excessive. Yields are reduced by the low-growing habit of the plant and its failure to make growth during fall and winter. The use of the grass is recommended only on sites where the water table is so close to the surface that the alfalfa roots rot.—John A. Stevenson.

99. SCHULTZ, E. F. Notas adicionales sobre la grama Rhodes. [Additional notes on Rhodes grass.] Rev. Indust. y Agric. Tucuman 11: 141-152. 5 fig. 1921.—Grazing experiments showed that Rhodes grass (*Chloris gayana*) is very resistant to freezing as well as to heat and trampling by stock. Cattle eat even the frozen material. The grass may be pastured close without injury and makes new growth in August when other pasturage is lacking. The shallow growing rhizomes permit of easy eradication by discing. It is not poisonous at any

stage of its growth. Stock pastured on this grass made satisfactory growth and produced meat of high quality. The grass seeds freely. Plantings should be made in the warm, rainy season to insure best stands, although success has been obtained at all seasons.—*John A. Stevenson.*

100. SHOWALTER, WILLIAM JOSEPH. Cuba,—the sugar mill of the Antilles. Nation. Geog. Mag. 38: 1-33. 24 fig. 1920.—Included in the description of Cuba is a discussion of the sugar and tobacco production of the island.—*W. M. Atwood.*

101. SMITH, F. H., and T. S. BUIE. Cotton fertilization experiments—1920. Georgia Agric. Exp. Sta. Bull. 137. 10 p., 1 fig. 1920.—Four types of raw phosphate were compared as sources of phosphorus for cotton (*Gossypium herbaceum*); none proving definitely superior. Indications are that raw ground phosphate may furnish some phosphorus during the 1st season; 2 successive applications give yields comparable to those with acid phosphate. Better yields were obtained when the raw phosphate was composted before using. Early applications of top dressings are advisable. On neutral soil, lime applications did not increase the yield. On heavy clay soils potash does not seem necessary; on sandy lands it is applied with profit. A 5-year test shows that on rich lands the rate of increase in cotton production is greatest for the first 200 pounds and that when complete fertilizers are applied the rate of increase in yield remained constant for applications heavier than 400 pounds per acre.—*T. H. McHatton.*

102. SNIDER, H. J. Recent crop yields from soil experiment fields in Illinois. Illinois Agric. Exp. Sta. Bull. 260. 8 p. 1922.—This circular presents in tabular form yields of wheat, corn, and oats obtained on a number of soil experiment fields located in different parts of the state. The figures cover a period of from 3 to 5 years, according to the duration of the rotation, in all cases ending with 1921.—*Mary R. Burr.*

103. SOULE, ANDREW M. Some factors affecting the economic production of cotton. Georgia State Coll. Agric. Bull. 247. 16 p., 5 fig. 1922.—The South is said to be losing its control of the world's cotton.—*T. H. McHatton.*

104. STAPLEDON, R. G. Germination of indigenous grass and clover seeds. Jour. Ministry Agric. Great Britain 29: 118-125. 1922.—Comparisons are made of the germinating capacity and other characteristics of seed collected from plants growing in their natural habitats with seed "once grown" at Aberystwyth and with ordinary commercial samples. The seed of indigenous species collected from various habitats tends to be of poor germinating capacity due in part to insects and in part to the difficulty of harvesting large quantities of seed under suitable and similar conditions. "Once grown" seed appears to be less attacked by insects and to germinate more satisfactorily. The precise value of "once grown" bulk-collected seed of such important grasses as perennial rye grass, cocksfoot, timothy, meadow foxtail, and others can only be determined by further investigation. It would seem from the results with wild white clover that reasonably good results may be expected from the inclusion of such "once grown" seed in mixtures designed for the preparation of long duration and permanent grass. The trials so far conducted at Aberystwyth tend to show that indigenous cocksfoot, rye grass, and timothy, for instance, have important qualities for long-duration pastures and are undoubtedly more persistent than their commercial counterparts.—*M. B. McKay.*

105. STAPLEDON, R. G. The growing and marketing of improved strains of herbage plants. Sci. Agric. 2: 405-408. 1922.—This address by the director of the plant breeding station at Aberystwyth, Wales, before the 1922 convention of the Canadian Society of Technical Agriculturists deals with work on clovers and grasses.—*B. T. Dickson.*

106. STEWART, ROBERT. The Illinois system of permanent soil fertility as developed by Cyril G. Hopkins. Illinois Agric. Exp. Sta. Circ. 245. 20 p., 14 fig. 1920.—In this address

before the Ohio Agricultural Experiment Station the basic principals of the Illinois system of permanent agriculture are discussed.—O. H. Sears.

107. TABOR, PAUL. Peanuts for the Piedmont section of Georgia Georgia State Coll. Agric. Bull. 249. 4 p., 1 fig. 1922.—A general discussion is presented of the preparation, cultivation, and harvesting of peanuts (*Arachis hypogaea* L.).—T. H. McHatton.

108. TAYLOR, C. SOMERS. Experiments with castor seed conducted at Sabour. Agric. Jour. India 16: 146-151. 1921.—Experiments have been made to determine whether by chemical selection it is possible to improve the castor oil plant (*Ricinus communis* L.). The mean oil content of the types grown at Sabour was 49.5 per cent. In the majority of cases the parent plants did not transmit a high or low oil-yielding tendency but in nearly every instance yielded seed with the oil content near the mean when the plants were healthy and a little lower when the reverse was the case. The author concludes that variations in agricultural treatment may have more effect on the oil yield of the crop than actual chemical selection.—A. Howard.

109. THOMPSON, G. E. Hegari in Arizona. Arizona Agric. Exp. Sta. Circ. 33. 4 p. 1921.—Hegari, a sorghum resembling kafir in appearance, is especially valuable in southern Arizona because it matures in about 110 days. It can be planted as late as early July, after the wheat harvest, and still mature before frost. It is used for grain, fodder, and silage.—Herbert C. Hanson.

110. THOMPSON, O. A. Edgeley substation report. Year ending June 30, 1921. North Dakota Agric. Exp. Sta. Bull. 161. 8 p. 1922.—1921 yields of wheat, oats, and barley secured from summer tillage plats were materially greater than for continuous tillage plats. Likewise wheat and oats following fallow in rotations outyielded these crops following small grains in rotations. In comparison with similar unmanured plats wheat and oats on manured fallow land showed decreased yields due to lodging. Oats after clover gave largest yield in comparison with oats after brome grass, alfalfa, and small grains. Early fall plowing showed some superiority to late fall plowing or to spring plowing. Wheat on disced corn land outyielded wheat on plowed corn land. Durum wheats outyielded all other varieties. The largest yields were secured from the rust-resistant durums, Monad, Acme, and D-5. The highest yielding varieties of oats and barley were Big Four and Manchuria respectively.—L. R. Waldron.

111. THOMPSTONE, E. Agriculture in the Shan States with special reference to the system known as "taungya" cultivation. Agric. Jour. India 16: 251-264, 396-405. 1921.—The Shan States lie between Burma and China and consist of an irregular plateau, about 3000 feet high, made up of well-wooded, grassy, upland plains and of open, treeless, rolling downs. The average annual rainfall is about 60 inches. The ordinary system of agriculture is known as taungya and consists in cutting down the jungle and firing it during the dry season, February-May. After this a variety of crops are grown,—hill rice, maize, potatoes, sesame, ginger, groundnuts, sweet potatoes, gourds, opium, cotton, and beans. The land is cultivated 1-3 years and then allowed to lie fallow for 4-15 years. Experiments have been conducted for some years to ascertain the best method of bringing these areas into permanent cultivation. Promising results were obtained by the use of lime and organic and green manures. The author concludes that by these means, combined with good cultivation and rotation of crops, continuous cultivation would be much more profitable than the present method of shifting from place to place.—A. Howard.

112. TROWBRIDGE, P. F. Report of the director, year ending June 30, 1921. North Dakota Agric. Exp. Sta. Bull. 159. 8 p., 2 fig. 1922.—For a 4-year average, wheat after clover yielded 22.2 bushels per acre, after potatoes 20.5 bushels, and after corn 20.4 bushels, on unmanured land. In a 9-year trial, stable manure increased wheat yields 2.6 bushels per acre or 12.5 per cent. In a 9-year period manure increased the yield of fodder-corn 527 pounds

per acre, or 8.5 per cent. Phosphatic fertilizers supplementing stable manure have increased yields of wheat less than 1 bushel per acre. Barley as a nurse-crop for sweet clover (*Melilotus alba*) tends to decrease seed production the 2nd year. In 1920 Assiniboine corn matured in 109 days and Minnesota 13 in 125 days.—*L. R. Waldron*.

113. VAGHOLKAR, B. P. Some observations on crude night-soil as manure to cotton in East Khandesh. Poona Agric. Coll. Mag. 12: 113-116. 1921.—“The rate and time of applying are the two most important factors that should be taken into consideration in using this manure for cotton.” In this part of India it should be applied before April. Judicious use has doubled the cotton yield for the year of application; the residual effect is small.—*Robert L. Pendleton*.

114. WALKER, G. B. Alfalfa in the Delta. Mississippi Agric. Exp. Sta. Bull. 209. 14 p., 4 fig. 1921.—The author discusses soils suited to alfalfa; preparation of seed bed; time, rate, and method of planting; inoculation; and time of cutting. Results of variety and fertilizer tests are given. Alfalfa as a pasture crop; alfalfa for coco-infested lands; getting grass out of alfalfa; and alfalfa in the crop rotation are each briefly discussed.—*J. Fred O’Kelly*.

115. WARD, F. C. Meade cotton. Georgia State Coll. Agric. Bull. 224. 4 p., 2 fig. 1921.—Meade cotton (probably *Gossypium herbaceum* × *G. barbadense*) is an upland, long-staple cotton that may be used to take the place of Sea Island cotton under boll weevil conditions; 4,000 acres of this variety were grown in Georgia in 1920. The standard length of staple set by the Government is 1½ inches and every effort should be made to maintain this length.—*T. H. McHatton*.

116. WARREN, D. C., and IRA W. WILLIAMS. Cotton dusting experiments of 1920—with recommendations for cotton dusting for coming season. Georgia State Bd. Entomol. Bull. 59. 15 p. 1921.—Dust applied while dew is on plants gives best results. The great fluctuation in cotton prices prevented any definite conclusions as to economic use of dust.—*T. H. McHatton*.

117. WARREN, D. C., and IRA W. WILLIAMS. Results of cotton dusting experiments for 1921 together with summary of the dusting results for past three years—with recommendations for cotton dusting for coming season. Georgia State Bd. Entomol. Bull. 62. 10 p. 1922.—The summary of the 3 years’ work in dusting with calcium arsenate against cotton boll weevil show an average gain of 206 pounds of cotton for short staple upland and 159 pounds gain on Sea Island cotton; 100 pounds of cotton pay for the dusting of an acre. Observations also show that the weevils not only get the poison from the dew but in other ways as well. Directions are given for dusting.—*T. H. McHatton*.

118. WESTBROOK, E. C. The tobacco plant bed. Georgia State Coll. Agric. Bull. 222. 8 p. 1920.—The author discusses and describes the preparation, care, and handling of tobacco (*Nicotiana tabacum* L.). Instructions for preparation of soils, use of fertilizers, and setting the plants in the field are also given.—*T. H. McHatton*.

119. WOODWARD, JOHN. Sulphur as a factor in soil fertility. Bot. Gaz. 73: 81-109. 1922.—A summary is given of work on the relation of soil sulphur to productivity. Field experiments were conducted with gypsum in Indiana and Kentucky. Soil analyses were made of soils from Indiana, Kentucky, Michigan, Ohio, and Wisconsin. “The analytical data show a general relation between the sulphur content and loss on ignition in soil samples from the same or closely related soil types, but the relation is not apparent when different soil types are compared. The sulphur contents of the surface soil vary from 0.0118 to 0.0905 per cent. All of the upland soils and most of the alluvial soils are low in sulphur.” The author finds that the highest sulphur content is sufficient for 39 years of alfalfa, 139 of clover, 159 of timothy, 355 of wheat, or 232 of corn. Though not quantitative, the field experiments indicate that tobacco, clover, and alfalfa have been benefited by the use of gypsum.—*B. W. Wells*.

120. ZADE. Die Anerkennung von Klee und Gräsern. [Certification of clover and grasses.] Mitteil. Deutsch. Landw. Ges. 37: 384-386 1922.—The statement covers the requirements for certifying fields of clover and grasses for seed production.—A. J. Pieters.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 44, 53, 59, 60, 79, 91, 267, 384, 426, 467, 478, 480, 497, 509, 534, 608, 731, 762, 763, 788, 808, 884)

121. ANONYMOUS. A list of one hundred popular books in science. Jour. Washington [D. C.] Acad. Sci. 11: 353-356. 1921.—At the request of Geo. F. Bowerman, Librarian of the Public Library of the District of Columbia, a committee of the Academy has compiled a list of scientific books which can be recommended for popular use. The following are of interest to botanists: Darwin, The Origin of Species; East and Jones, Inbreeding and Outbreeding; Castle, Coulter, Davenport, East, and Tower, Heredity and Eugenics; Morgan, A Critique of the Theory of Evolution; Conklin, Heredity and Environment; Galton, Hereditary Genius; Popenoe and Johnson, Applied Eugenics; Lotsy, Evolution by means of Hybridization; Ganong, The Living Plant; Osterhout, Experiments with Plants; Sorauer, A Popular Treatise on the Physiology of Plants; Lubbock, Flowers, Fruits, and Leaves; Hardy, The Geography of Plants; Darwin, Insectivorous Plants; Townsend, Sand Dunes and Salt Marshes.—Helen M. Gilkey.

122. ANONYMOUS. Current topics and events. Nature 109: 383. 1922.—Rothamsted Station has taken over the Stockyard field, Woburn, held by the Royal Agricultural Society for many years. The Society will continue investigational work on the fields belonging to its members.—O. A. Stevens.

123. ANONYMOUS. Dr. A. B. Rendle. Gard. Chron. 70: 256. *Portrait*. 1921.—A brief biographical sketch is presented.—P. L. Ricker.

124. ANONYMOUS. E. H. Jenkins. Gard. Chron. 70: 266. *Portrait*. 1921.—E. H. Jenkins, author of The Rock Garden, Hardy Flower Book, and many articles in the horticultural journals, died Nov. 9, 1921, in his 66th year. A brief sketch of his work is included.—P. L. Ricker.

125. ANONYMOUS. Edwin Molyneux. Gard. Chron. 70: 266, 268, 281, 282. 1921.—A biographical sketch is given of Edwin Molyneux (1851-Nov. 12, 1921).—P. L. Ricker.

126. ANONYMOUS. Sir Isaac Bayley Balfour. Gard. Chron. 71: 161-162. *Portrait*. 1922.—His retirement as keeper of the Edinburgh Botanical Garden is noted; a brief biographical study is presented.—P. L. Ricker.

127. ANONYMOUS. The British cotton industry research institute. Nature 109: 457-458. 2 fig. 1922.—A detailed description with floor plan is given of the recently opened laboratory of the British Cotton Industry Association at the Shirley Institute, Didsbury, Manchester.—O. A. Stevens.

128. ANONYMOUS. The director of Kew. Gard. Chron. 71: 85. 1922.—A brief sketch is presented of Sir David Prain on the occasion of his retirement from the Kew directorship, now assumed by A. W. Hill.—P. L. Ricker.

129. ANONYMOUS. The origin of the potato. [Rev. of: HEDRICK, U. P., Editor. Sturtevant's notes on edible plants. Rept. New York Agric. Exp. Sta. [Geneva] 1919²: i-vii, 1-686. *Portrait*. 1919 (see Bot. Absts. 8, Entry 862).] Gard. Chron. 71: 37. 1922.

130. ANONYMOUS. Thomas Andrew Knight as a pomologist. *Gard. Chron.* 71: 201. 1922.—This is a brief sketch of Knight's work made on the occasion of the award of the Knightian and Hogg medals.—*P. L. Ricker.*

131. ARBER, E. A. NEWELL. Sketch of the history of paleobotany with special reference to the fossil flora of the British coal measures. *Studies Hist. and Method of Sci.* 2: 472-489. *Pl.* 48-55, 1 fig. 1921.—In the prescientific period Lhuyd (Lhuyd or Luidius) (1660-1709) published a catalog describing plant fossils. Woodward (1665-1728) and James Parsons (1705-1770) advocated the flood theory of the origin of plant fossils, even giving the season of the year in which it occurred. Robert Plot (1640-1696), David Ure, and Emanuel Mendes da Costa (1717-1791) further advanced the science. The first binomials were applied by Henry Steinhauer and published in Philadelphia, Pennsylvania, in 1818. Ernst Friedrich Baron von Schlotheim (1764-1830), William Martin (1767-1810), and James Parkinson (d. 1824) belong to this transitional period. The pioneers of the scientific period were interested primarily in taxonomy. Kaspar Maria Graf von Sternberg (1761-1838), Adolphe Theodore Brongniart (1801-1876), Edmund Turell Artis (1789-1847), John Lindley (1799-1865), and William Hutton (1798-1860) published systematic accounts. William Nicol (?1768-1851) first studied sections of petrifications, publishing in 1831-1835. Henry Thomas Maire Witham (1779-1844) also began publication in this field in 1831. The modern period, beginning about 1870, has been more purely botanical in outlook.—*C. W. Dodge.*

132. BAZELEY, MARGARET LEY. The extent of the English forest in the 13th century. *Trans. Roy. Hist. Soc. London* IV, 4: 140-172. 2 maps. 1921.

133. BROTHERSTON, R. P. Donald Beaton. *Gard. Chron.* 71: 196. 1922.—Brief mention is made of his life, work, and writings.—*P. L. Ricker.*

134. BROTHERSTON, R. P. The Antirrhinum. *Gard. Chron.* 70: 248. 1921.—No date of introduction into cultivation has been found; Turner states it was brought from Italy. A few color variations were known in 1578, and it is figured by Parkinson. By 1824 there had been considerable progress in its development. In 1844 a double-flowered variety appeared. Notes are given on cultivation.—*P. L. Ricker.*

135. BROTHERSTON, R. P. The greenhouse, hothouse, and stove. *Gard. Chron.* 71: 78. 1922.—The article, dealing with the above work of Charles McIntosh (b. 1794), includes a brief biographical sketch and notes on plants cultivated during this early period.—*P. L. Ricker.*

136. BROTHERSTON, R. P. The nettle as a food. *Gard. Chron.* 71: 232. 1922.—Three quotations are given from Scotch verse regarding the nettle, together with data as to its former extensive use as a medicine and for human and stock food.—*P. L. Ricker.*

137. BUNYARD, E. A. An early Vilmorin catalogue. *Gard. Chron.* 71: 78. 1922.—Notes are given on an octavo volume of 130 pages published in 1771. This old catalogue includes a list of 22 varieties of strawberries and some flowers as well as a long list of pears.—*P. L. Ricker.*

138. CHIOVENDA, E. Odoardo Beccari. *Nuovo Gior. Bot. Ital.* 28: 5-35. *Portrait.* 1921.—Odoardo Beccari, born Nov. 19, 1843, was educated at R. Collegio di Lucca and at the University at Pisa. After a brief period of study at Kew he joined Doria on an expedition to Borneo (1865-1868). On his return he founded the *Nuovo Giornale di Botanica Italiana*, in 1870 he spent a year in the orient, and joined the D'Albertis expedition to New Guinea (1871-1876) and other parts of the orient (1877-1878). He succeeded Parlatore as director of the museum and botanical garden at Florence (1878-1897). His life was devoted to the study of tropical plants, especially palms. He died Oct. 25, 1920. His biography is followed by an exposition of his biological theories and a bibliography of 10 pages.—*C. W. Dodge.*

139. CORONADO, J. A. *Resumen de mi bibliographia general sobre el café.* [Résumé of my bibliography of coffee.] *Bol. Camara Agric. Costa Rica* 1: 282-288. 1921.

140. [DUDGEON, WINFIELD.] *Indian Botanical Society Bulletin. No. 2.* 8 p. Allahabad. 1921.—A little publication appearing at irregular intervals, intended to promote the interests of the Society. This number contains a plea to make the encouragement of research the primary aim of the Society; and news notes of interest to members. The 1st issue [see *Bot. Absts.* 8, Entry 846] was not numbered. [See also 2 succeeding entries.]—*Winfield Dudgeon.*

141. [DUDGEON, WINFIELD.] *Indian Botanical Society Bulletin. No. 3.* 10 p. Allahabad. 1922.—A list of members complete to date and the program for the annual meeting at Madras in February, 1922, are given.—*Winfield Dudgeon.*

142. [DUDGEON, WINFIELD.] *Indian Botanical Society Bulletin. No. 4.* 14 p. Allahabad. 1922.—This issue of the bulletin contains a supplementary membership list; a report of the annual meeting at Madras in February, 1922; and plans for carrying on the work of the Society.—*Winfield Dudgeon.*

143. FARSKY, OCT. *Fytopathologická sekce výzkum. ústavu zemědělského v Brně a organisace fytopathologické služby na Moravě, Slezku, Hlučínsku a Valčicku.* [Section for phytopathology in the agricultural experiment station in Brno (Brünn) and organisation of phytopathological work in Moravia, Silesia, Hlučínsko, and Valčicko.] *Ochrana Rostlin* 1: 27, 28, 38-39. 1921.—The agricultural experiment station at Brünn was founded in 1899. A section of phytopathology was established in 1919 but the work did not begin until the winter of 1920. The head of the station is Docent Dr. E. Baudyš. With him are associated 4 scientific investigators (adjuncts), 1 assistant, and 1 laboratory assistant. The work of the section consists of determination and study of diseases, tests of chemicals and apparatus used in control and organization of their production, preparation of calendars and maps of the distribution of diseases, organization for statistical and inspection purposes, and selection of resistant varieties. Interest in phytopathology is stimulated by lectures, field demonstrations, and leaflets.—*E. Baudyš.*

144. FIALON, CHARLES-HENRI. *History of the words "pharmacie" and "apothicaire."* *Amer. Druggist and Pharm. Rec.* 70: 18-19. 1922.—The author traces the words from their Greek origin and shows how they were first used synonymously. "Apothicaire" was finally abandoned, and now only "pharmacist" is given as a title.—*C. M. Sterling.*

145. G[ATES], R. R. [W. B. Bottomley.] *Nature* 109: 524-525. 1922.—W. B. Bottomley was born at Leeds, December 26, 1863, and died March 24, 1922. He was educated at Royal Grammar School, Lancaster, King's College, Cambridge, and at Heidelberg, where he received his Ph. D. degree. A lecturer at St. Mary's Hospital from 1886 to 1891, he was next appointed to the professorship of biology at the Royal Veterinary College, serving also as assistant to Prof. Oliver at University College, London, and as Cambridge University Extension lecturer. From 1893 to 1920 he was professor of botany at King's College, London. His chief interests were with plant nutrition and its relations to agriculture. His most important contribution was the discovery of "auximones," growth-promoting substances which withstand a temperature of 150°C.—*O. A. Stevens.*

146. GUENTHER, FRITZ. *Friedrich Lucas.* *Gartenwelt* 25: 180. 1921.—Friedrich Lucas was born October 30, 1842, in Regensburg, and died August 21, 1921 in Reutlingen. He devoted his life to pomology, writing much on this subject. Until his death he was director of the pomological institute in Reutlingen, Germany.—*J. C. Th. Uphof.*

147. GULICK, ADDISON. *Charles Darwin, the man.* *Sci. Monthly* 15: 132-143. 1922.

148. GUNTHER, R. T. **Early British botanists and their gardens based on unpublished writings of Goodyer, Tradescant and others.** vi + 417 p., 9 pl., 29 fig. University Press: Oxford, 1922. 42 s.—John Goodyer was born at Alton in Hampshire in 1592. For some years he was a steward of Sir Thomas Bilson at West Mapledurham. About 1632 he married and settled at Petersfield, where he died in 1664. He translated Dioscorides and Theophrastus, described many plants, and annotated many of the older herbals. His plant descriptions are printed in full and a careful catalog of his library is given. Many data from the Goodyer papers are given concerning Thomas Penny (1530–1589), a botanist of Oxford and Winchester, (?Walter Bayley 1529–1592), Richard Garth (d. 1597), William (1520?–1600?) and Sir John Salusbury of Lleweni (1567–1612), M. l'Obel (1538–1616), Wm. Mount (1545–1602), Richard Shanne (1561–1627), John Parkinson (1567–1650), Walter Stonehouse (1597–1655), Thomas Johnson (?1600–1644), William How (1619–1656), John Dale (d. 1662), and William Browne (1629–1678). Biographical information of many of their contemporaries appears in footnotes. Garden lists from several of the above as well as from Simon Forman, Lord Salisbury, William Coys Franqueville, John Tradescant the elder, George Gibbes, Edward Morgan, and Robert Morison are given. The work of William Coys on cultivation of yeast and beer making is printed.—The book is well indexed and well illustrated by reproductions from contemporary herbals and by facsimiles of the manuscripts.—*C. W. Dodge.*

149. J[ATUL], P. A. **Abstraktai iš Musū Botanikos.** [Abstracts from our botanists.] *Želmenija* 2: 76–78. 1922.—A brief history of Lithuanian botany to the close of the 19th century is followed by 14 short abstracts of agricultural and botanical articles.—*C. W. Dodge.*

150. JATUL, P. A. **Arnold Arboretum.** *Želmenija* 2: 73–75. 1922.—A brief historical account of this institution is given with a list of the publications issued by it.—*C. W. Dodge.*

151. LIVINGSTONE, R. W., Editor. **The legacy of Greece.** 424 p., 36 fig. Clarendon Press: Oxford, 1921.—This is a collection of historical essays, of which those dealing with biology and medicine are by CHARLES SINGER. On the botanical side, attention is directed to the anonymous work on generation (380 B. C.) and later works by Aristotle, Theophrastus, Crateuas (1st century B. C.) Pliny, and Dioscorides.—*C. W. Dodge.*

152. LYMAN, G. R. **Report of the thirteenth annual meeting of the American Phytopathological Society.** *Phytopathology* 12: 195–204. 1922.

153. McCALLUM, A. W. **Abstracts of Canadian plant pathological literature.** *Quebec Soc. Protection Plants Ann. Rept.* 14: 110–115. 1922.—Abstracts of and references to papers published during 1921 are given together with those missed in the previous lists. Some 97 references are included.—*B. T. Dickson.*

154. MENZIES, DAVID. **Dr. Archibald Menzies.** *Gard. Chron.* 70: 320, 324. Fig. 143–145. *Portrait.* 1921.—A brief biography and account of his travels and plant introductions are presented.—*P. L. Ricker.*

155. OBERLY, E. R. **The contribution of librarians to agricultural history and research.** *Library Jour.* 47: 249–254. 1922.—A brief discussion of the routine work of the reference librarian is followed by an account of the development of library facilities in the U. S. Department of Agriculture. Attention is called to many bibliographies covering a wide range of agricultural subjects.—*C. W. Dodge.*

156. PARKER, W. H. **The national institute of agricultural botany.** *Jour. Ministry Agric. Great Britain* 28: 1072–1084. 2 fig. 1922.

157. RICHARDSON, A. D. **The Arncliffe larches.** *Gard. Chron.* 71: 258–259. 1922.—No authentic record of date of introduction of the larch into England has been found. The larch

is in Gerard's catalogue of 1596 and not found again until mentioned by Parkinson in 1629. The Arniston Memoirs (1887) indicate that those on the estate were planted in 1738. Other early records of England and Scotland are given.—*P. L. Ricker.*

158. RIEFSTAHL, MEYER R. The pictures of plowing and weaving. Asia 20: 1059-1063. 10 fig. 1920; 21: 47-51. 10 fig. 1921.—Notes are given on the editions of a famous Chinese agricultural treatise with reproductions of several illustrations from an 18th (?) century edition.—*C. W. Dodge.*

159. ROBERTS, W. A seedman's broadside. Gard. Chron. 71: 54. Fig. 27. 1922.—The heading is reproduced of a 1769 seed list of Vilmorin & Co., and a brief early history of the firm is given.—*P. L. Ricker.*

160. ROBERTS, W. The Auricula. Gard. Chron. 69: 310. 1921.—One of the earliest accounts of this popular English garden plant is given in John Rea's Flora in 1665. Its full popularity was not reached until the 18th century. The names of many early varieties and a sales list of 1756 quoted from a letter to Dr. Richard Richardson from the younger Bobart. A Treatise on the Culture and Management of the Bear's Ear, or *Auricula ursi*, written by "a Florist of nearly 30 years' experience," and printed at Bath, England, in 1782, enumerated 250 varieties. Some were then sold as high as £ 50. Further historical notes down to 1816 are given. [A few corrections and comments on this article are given by C. HARMAN PAYNE, Gard. Chron. 70: 21. 1921.].—*P. L. Ricker.*

161. ROPER, I. M. The earliest English herbal. Somersetshire Archaeol. and Nat. Hist. Soc. Proc. 67: 65-71. 1922.—A popular paper on the life and work of William Turner (1510-1568), dean of Wells Cathedral, is followed by notes by J. HAMLET which add bibliographical information and call attention to his letters published in Calendar of State Papers, Domestic. Edward VI 7: no. 32; 10: no. 34; 11: no. 14; 13: no. 1, 19. 1856.—*C. W. Dodge.*

162. SAVAGE, S. The discovery of some of Jacques Le Moyne's botanical drawings. Gard. Chron. 71: 44. 1922.—Notes are given on a collection of 59 excellent water color drawings found at the Victoria and Albert museum, South Kensington. Le Moyne accompanied one of the French expeditions to America as an artist and later settled in London, where he died in 1588. He published a book of wood cuts of animals, birds, and plants in London in 1586.—*P. L. Ricker.*

163. SINGER, CHARLES. Greek biology and its relation to the rise of modern biology. Studies Hist. and Method of Sci. 2: 1-101. Pl. 1-25, fig. 1-43. 1921.—Greek science has left its conclusions without a hint of the processes of reasoning which led to them. The work of the rhizotomists, Theophrastus and Nicander, the probable author of the Alexipharmaca and Theriaca, is briefly discussed. More attention is given the work of Crateuas and his tradition in the Julia Anicia MS. The Greek codices of Dioscorides and their tradition is carefully discussed. Two schools of botanical illustration are discerned: the Naturalistic, spreading from southern Italy perhaps along with Beneventan script and influence, and the Romanesque, spreading from northern and eastern France. Improvement begins with the De Vegetabilibus of Albertus Magnus (1206-1280), compiled from Nicolas of Damascus. The manuscripts and early editions of the Herbarius and the Hortus Sanitatis are described. The growth of the knowledge of classification, of generation and development, of form and structure, and of habit and distribution is further discussed with quotations from many sources from Theophrastus to the 16th century. The article is well illustrated by reproductions in color from illuminated manuscripts dating from the 5th to the 15th century.—*C. W. Dodge.*

164. SINGER, CHARLES. Steps leading to the first optical apparatus. Studies Hist. and Method of Sci. 2: 385-413, 533-534. Fig. 1-11. 1921.

165. STRAŇÁK, FR. *Organisace služby rostlino-lékařské v republice Československé.* [Organization of phytopathological work in the republic of Czecko-Slovakia.] *Ochrana Rostlin* 1: 14-15. 1921.—Agricultural institutions are united into "Svaz pro zemědělské a zemědělsko-prumyslové výzkumnictví" (a union for the investigation of agriculture and agricultural industries). In the union there is a commission for phytopathology which is responsible for the organization of phytopathological work in the whole republic. The activity consists of securing information and statistics, publicity, control, and research. Results are collected by central stations at Praha (Prague), Brno (Brünn), Bratislava (Pressburg), and Košice. Besides these stations there are substations in Roudnice, Tabor, and Libverda. Estimates for statistics are made by collaborators named by the minister of agriculture. This work is honorary. Extension work is carried on through lectures, field demonstrations, exhibitions, and publications.—*E. Baudyš.*

166. TAUBENHAUS, J. J. Report of the fourth annual meeting of the Southern Division of the American Phytopathological Society, at Atlanta, Georgia, Feb. 20-22, in connection with the general meeting of the Association of Southern Agricultural Workers. *Phytopathology* 12: 249. 1922.

167. THOMPSON, J. ARTHUR. *Science and the farmer.* *Jour. Ministry Agric. Great Britain* 29: 217-223. 1922.

168. TRELEASE, SAM F., and EMMA S. YULE. *The preparation of theses and other manuscripts.* 20 p. College Coöperative Co., Inc.: Los Baños, Laguna, Philippine Islands, 1919.

169. VIELWERTH, VL. *Organisácia rostlinolekárskej služby na Slovensku.* [Organization of phytopathological work in Slovakia.] *Ochrana Rostlin* 1: 9-10. 1921.—Slovakia is divided into eastern and western districts because of difference in agriculture. The work in the western part is carried on by Státní ústav pro zdravotnú ochranu rostlin (state institute for the control of plant diseases) located in Bratislava (Pressburg), and in the eastern part of the state agricultural experiment station in Košice, which has a department for plant pathology.—*E. Baudyš.*

170. WARD, HENRY B. *Ansel Augustus Tyler.* *Science* 56: 37. 1922.

171. W[HITE], J. W. *In memoriam Cedric Bucknall.* *Somersetshire Archaeol. and Nat. Hist. Soc. Proc.* 67: lxxviii-lxix. 1922.—A musician by profession. Bucknall was well known for his work on *Symphytum*, *Euphrasia*, the fungi of the Bristol district, and other work on the local flora. He died Dec. 12, 1921.—*C. W. Dodge.*

172. WIESEMANN, C. *Kgl. Garteninspektor Carl Friedr. Julius Bouché.* *Gartenwelt* 26: 384. 1922.—Bouché, royal horticultural inspector in Bonn, died June 28, 1922.—*J. C. Th. Uphof.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 63, 121, 143, 337, 347, 423, 452, 453, 458, 471, 477, 608, 731, 732, 733, 734, 892)

173. ANONYMOUS. [Rev. of: COUSINS, H. H. *The chemistry of the garden: a primer for amateurs and young gardeners.* Rev. ed., xxxi + 147 p. Macmillan and Co.: London, 1921.] *Nature* 109: 443. 1922.

174. ANONYMOUS. [Rev. of: ELFORD, P., and S. HEATON. *Practical school gardening.* 2nd ed., 224 p. Clarendon Press: London, 1921.] *Nature* 109: 514. 1922.

175. DOWDLE, LOIS P., and GEORGE H. FIROR. Instructions for club girls in beans, okra, corn and onion culture. Georgia State Coll. Agric. Bull. 232. 12 p., 7 fig. 1921.

176. GLEISBERG, W. Die höhere Gärtnerlehranstalt. [The institution for higher horticultural education.] Gartenwelt 26: 382-384. 1922.—The writer compares lower, middle, and higher education in horticulture, especially with reference to German conditions. A critical, detailed outline is given of sciences which are adaptable to higher education in horticulture.—J. C. Th. Uphof.

177. LLOYD, F. E., and G. W. SCARTH. An introductory course in general physiology. 8vo., 16 p. Privately printed: Montreal, 1921.—This work includes outlines of laboratory exercises based on extensive experience in teaching, especially the teaching of medical students and is intended as an introduction to modern physiological methods of study in the field covered. Materials and experiments are briefly indicated, the purpose being to put problems before the student. The work assumes the completion of a course in general biology. The materials are chiefly, but not exclusively, botanical. Synopses of the different parts follow: (1) review of biological material (general morphology of living cell), (2) surface tension, (3) colloidal state, (4) hydrogen-ion concentration, (5) diffusion and osmosis, (6) digestion, role of enzymes. Each synopsis is divided into 2 parts; (a) physical phenomena, (b) behaviors in protoplasm more or less susceptible of explanation in the light of (a).—F. E. Lloyd.

178. PICKETT, F. L. The teaching of evolution. Science 56: 298-301. 1922.

179. ROBERTSON, D. W. A course to train specialists in agronomy. Sci. Agric. 2: 328-331. 1922.—The article discusses prerequisites and outlines suggested courses.—B. T. Dickson.

180. WEIGELT, KARL. Rückblick auf die 50 jährige Jubelfeier der Höheren Staatlichen Lehranstalt für Wein-Obst- und Gartenbau zu Geisenheim a. Rhein 1872-1922. [Review of the 50-year jubilee of the State College for Viticulture, Pomology and Horticulture in Geisenheim on the Rhine, 1872-1922. Möllers Deutsch. Gärt. Zeitg. 37: 199-202. 5 fig. 1922.

CYTOLOGY

G. M. SMITH, *Editor*

(See also in this issue Entries 406, 420, 777)

181. BALLY, WALTHER. Einige Bemerkungen zu den amitotischen Kernteilungen der Chytridineen. [Observations on the amitotic nuclear division of the Chytridineae.] Ber. Deutsch. Bot. Ges. 37: 103-107. Fig. 1. 1919.—This paper is a defense of the author's previously published statements of the occurrence of amitotic division in the primary nucleus of *Synchytrium Taraxaci*. On the basis of a re-examination of his preparations, and a comparison of *Synchytrium* species with *Chrysophlyctis endobiotica*, the author reaffirms the occurrence of the amitotic divisions and denies Rytz's assertions that they are artifacts brought about by the fixing solution.—R. M. Holman.

182. CLELAND, RALPH E. The reduction divisions in the pollen mother cells of *Oenothera franciscana*. Amer. Jour. Bot. 9: 391-413. 3 pl. 1922.—The stages from the resting condition preceding the heterotypic prophase up to the formation of spores are described in detail. Because of the absence of parallelism at all stages and from certain other facts a telosynaptic rather than a parasynaptic interpretation at the spireme is favored. The chromosomes of the last archesporial mitosis are apparently arranged according to a definite plan, so that they come to occupy the same relative position in the subsequent prophase stages. The nucleole seems to store material of some sort, probably chromatin, and is formed anew in each nucleus. This species is very stable genetically and its reduction processes are also very

regular and typical, thus resembling *O. grandiflora* but differing markedly from the less stable species of the genus.—*E. W. Sinnott.*

183. CONN, H. J. American biological stains compared with those of Grüber. *Science* 55: 284-285. 1922.—Tests of stains have proved American products to be equal to Grüber stains. Both are found to vary widely.—*C. J. Lyon.*

184. CONN, H. J., and others. Preliminary report on American biological stains. *Science* 56: 156-160. 1922.—The committee, organized under the auspices of the National Research Council, reports on the utility of American dyes for bacteriology. They recommend the medicinal quality of methylene blue manufactured by Coleman & Bell Co., National Aniline and Chemical Co., or Providence Chemical Co. For staining bacteria and for use in the Endo medium, satisfactory samples of basic fuchsin, as good as Grüber's dye, were obtained from several companies. Gentian violet includes a variety of dyes and stains. For Gram stain, crystal violet (hexamethyl-pararosanalin) is recommended in place of gentian violet; also for other work unless it be known that crystal violet will not work. Crystal violet can be obtained pure from nearly all dealers. The c. p. haematoxylin prepared by McAndrews & Forbes is generally rebottled by other concerns without change and seems to be the only c. p. product on the market. For eosin, it is unsettled what brands are best. For orange G, the products of several prominent companies appear to be satisfactory; all seem to be more concentrated than the Grüber product. For pyronin, few samples have been tested, but that of Providence Chemical Co. proved satisfactory.—*C. J. Lyon.*

185. DANGEARD, P. A. Sur la nature du sphérome dans la cellule végétale. [On the nature of the sphérome in the plant cell.] *Compt. Rend. Acad. Sci. Paris* 173: 1038-1041. 1921.—Dangeard objects to Guilliermond's use of the term sphérome for the ordinary granules which develop during the metabolism of the cell. These granules do not stain when subjected to mitochondrial methods of microtechnique.—*C. H. Farr.*

186. DANGEARD, PIERRE. Sur l'origine des vacuoles aux dépens de l'aleurone pendant la germination des Graminées. [On the origin of vacuoles from aleurone during the germination of cereals.] *Compt. Rend. Acad. Sci. Paris* 174: 319-321. 12 fig. 1922.—The aleurone grains or proteoplastids originate from primordia comparable to those of the chloroplasts. The structures giving rise to the aleurone grains in corn, wheat, rice, and oats are figured and described. Aleurone grains are not special plastids, but represent elements of the vacuome, as in *Pinus* and *Ricinus*. Aleurone grains give rise to vacuoles during germination.—*C. H. Farr.*

187. DEVISÉ, RENÉ. La figure achromatique et la plaque cellulaire dans les microsporocytes du "*Larix europaea*." [The achromatic figure and the cell plate in the microsporocytes of *Larix europaea*.] *La Cellule* 32: 247-309. Pl. 4. 1922.—The use of microtechnique methods in the study of the achromatic figure shows that it is entirely of nuclear origin.—During the winter rest period the nucleus of the microsporocyte is in an advanced prophase stage, and the cytoplasm is homogeneous and contains many chondriocents; the cytoplasmic reticulum observed after Flemming's and other fluids is an artifact, and the droplets associated with it are largely altered chondriosomes. In early spring the chondriocents move endwise toward the nucleus and lay themselves parallel to its membrane, forming a dense "perinuclear chondriosomal mantle." Improper fixation of these structures gives the "radial stage" and "felted stage" of other authors. The chondriosomal mantle remains intact throughout mitosis, its inner boundary marking the limit of the nuclear area. As the nuclear membrane disappears the chromosomes become grouped at the center of the nucleus, the peripheral portion of which is then occupied by a substance representing karyolymph which has been rendered denser, probably through the influence of the cytoplasmic fluid. It is possible that the nucleolar material also plays a rôle here. The spindle arises wholly from this peripheral intranuclear substance, the cytoplasm contributing no formed element. The spindle fibers,

which are no more numerous than the chromosomes, do not invade the nucleus from without; they appear first at the surface of the chromosomes and develop centrifugally until the completed spindle extends across the nuclear region with its poles at the chondriosomal mantle and surrounded on its flanks by the intranuclear substance. The figure is bipolar from the start. Multipolar spindles are artifacts arising through alterations of the chondriosomes and intranuclear substance, as are also the many "mantle fibers" said to surround the spindle proper,—the greater the alteration of the chondriosomes in fixation the more numerous the fibers. The fibers are not such in the strict sense, but are rather lamellae bounding elongated alveolae.—At telophase the terminal portions of the spindle and the remaining intranuclear substance become 2 masses of hyaline fluid in which the chromosomes lie and around which the chondriocents are grouped. The daughter nuclei are reconstituted in these hyaline areas—in substance which is continuous with that of the mother nucleus. The remains of the spindle disappear between the daughter nuclei, no wall forming after the 1st maturation mitosis. The chondriosomes form mantles around the nuclei. The origin and behavior of the achromatic figure in the 2nd mitosis is essentially the same as in the 1st.—Cytokinesis after the 2nd mitosis begins with the formation of a cell plate, which first appears as a delicate layer in the homogeneous material between the spindle fibers. It is not formed by the union of swellings on the fibers; the fibers appear to be wholly passive and show no swellings in well fixed preparations. The cell membrane forms by the deposition of material in the cell plate.—*L. W. Sharp.*

188. DRAGOIU, J. Influence de la pression osmotique sur la division cellulaire. [The influence of osmotic pressure on cell division.] *Compt. Rend. Acad. Sci. Paris* 174: 199–202. 1922.—This supplementary report on the effect of hypertonic solutions of 30–50 atmospheres pressure on the mitosis of sea-urchin eggs shows that in some cases the nucleus regains its ability to divide after being returned to normal sea water. In most concentrations, however, there is no recovery after return to sea water.—*C. H. Farr.*

189. FARR, CLIFFORD H. The meiotic cytokinesis of *Nelumbo*. *Amer. Jour. Bot.* 9: 296–306. 1 pl., 1 fig. 1922.—In cytokinesis of pollen mother-cells of *Nelumbo lutea* the walls are unequally thickened on various sides of the same cell. There is a succession of division stages from one part of the anther to another though not always from one end to the other. From the comparative abundance of the stages, it is evident that karyokinesis proceeds much more rapidly than does cytokinesis. Eight seems to be the haploid chromosome number. After the heterotypic division, an incomplete and transitory cell plate is formed which disappears in interkinesis; no plate is formed after the homoeotypic division. Following the tetranucleate stage, quadripartition of the cell occurs by furrowing, the furrows being very slender. The spindle fibers now disappear, the walls become thicker, and the microspores round up.—*E. W. Sinnott.*

190. GEORGEVITCH, PIERRE. L'origine du centrosome et la formation du fuseau chez *Stypocaulon scoparium* (L.) Kutz. [The origin of the centrosomes and the formation of the spindle in *Stypocaulon scoparium*.] *Compt. Rend. Acad. Sci. Paris* 174: 695–696. 1922.—It is reported that both the centrosome and the spindle arise on the interior of the nucleus. No figures are given.—*C. H. Farr.*

191. G[OLDSCHMIDT], R. [Rev. of: ABDERHALDEN, EMIL. *Handbuch der Biologischen Arbeitsmethoden*. (Handbook of biological technique.) Urban and Schwarzenberg: Vienna, 1920.] *Arch. Zellf.* 16: 285. 1922.

192. GUILLIERMOND, A., et G. MANGENOT. Sur la signification de l'appareil réticulaire de Golgi. [On the significance of the reticular apparatus of Golgi.] *Compt. Rend. Acad. Sci. Paris* 174: 692–694. 1922.—An attempt is made to harmonize the reticulum of Golgi with the canalicules of Holmgren as a modification of the vacuolar system. Descriptions and figures are given of these structures in the meristem of rice roots.—*C. H. Farr.*

193. KELLER, R. Die elektrische Charakteristik der Farbstoffkolloide. [The electrical properties of colloidal dyestuffs.] *Kolloid Zeitschr.* 26: 173-178. 1920.—Solutions of almost all dyestuffs, especially those of animal origin, consist of 2 phases: a colloid phase that obeys the laws of cataphoresis of neutral colloids, and a molecularly dispersed phase with a colored cation. Besides a discussion of the theoretical physical chemistry of these dyes and its experimental basis the author includes some observations on their behavior in plant cells. Most of the simple dyes are anodic in the living plant cell although osmic acid stains fats at the negative pole and Sudan III in alcohol wanders to the cathode. A rule of vital staining is that the dye inside the cell behaves as if it were composed only of its colloidal phase, perhaps due to the adsorption of ions on invisible cell colloids, the migration tendencies of which it shares. The gentian violet-safranin-orange mixture is violet at the anode, yellow-red at the cathode, and stains chromatin violet and cytoplasm yellow-red.—H. E. Pulling.

194. McFARLAND, F. M. Some simplifications of microscopical technique. *Science* 56: 43-44. 1922.—Acetone is recommended as a substitute for alcohol in hydration and dehydration of mounted sections in passing to and from the stains. Absolute acetone is used in 1 bottle and C. P. acetone in 2 other bottles.—In staining ribbons of sections without removal of paraffine, they are floated upon the surfaces of the stains and distilled water, floated into place upon the surface of an albumenized slide, dried, cleared, and mounted. Sections of the same tissues may thus be stained by different methods and mounted side by side for comparison. The removal of the paraffine is necessary only in case a very narrow diaphragm opening is used.—C. J. Lyon.

195. POLICARD, A., et G. MANGENOT. Action de la température sur le chondriome cellulaire. Un critérium physique des formations mitochondriales. [The effect of temperature on the chondriosomes of cells. A physical criterion for the formation of mitochondria.] *Compt. Rend. Acad. Sci. Paris* 174: 645-647. 1922.—A study is reported of living cells of an alga, *Saprolegnia*, the epidermis of young leaves of *Iris*, and the epidermis of petals of tulip. Between 48 and 50°C. rapid alteration of mitochondria occurs; this alteration is in the nature of a vacuolization. The temperature at which the mitochondria completely disappear has not been definitely determined.—C. H. Farr.

196. RANDOLPH, L. F. Cytology of chlorophyll types of maize. *Bot. Gaz.* 73: 337-374. *Pl.* 11-16. 1922.—This study of correlation of cell structure with the known genetic behavior of maize involved observations on living and fixed and stained cells of 4 chlorophyll types of maize, namely, "normal green," "Mendelian white," "Mendelian virescent," and "maternal inheritance strain." All contain the same initial cell structure,—bodies, "proplastids," from which chloroplasts develop later. Proplastids are present in every type and have the same size and general appearance in each case. They are rarely more than 1 μ in diameter. Transitional stages in the development of proplastids into chloroplasts are described for the "normal green" type. The green color is not present in the plastids before they are approximately half the size of mature functional plastids. The other chlorophyll types studied are due to the failure of the proplastids to develop into plastids of normal size or color or both. In the "Mendelian white" the proplastids of green plants are like those of the "normal green," while in the white plants the proplastids neither develop rapidly nor ever reach the size of normal chloroplasts. The extreme tip of the albino seedling leaf, however, has a limited region of cells containing green chloroplasts. In "Mendelian virescent," the formation of chloroplasts with their pigment seems to be merely delayed, but when once started continues until the whole plant becomes green. In "Maternal inheritance strain," the green plants are like those of the "normal green" in cytological details. The yellowish green plants show the series of stages in development of chloroplasts, with exception of maximum size, depth of color, and number per cell. The striped plants show to the naked eye a sharp line between green and yellow green; microscopic examination shows a region of transition, 1 to several cells in width, where the plastids of many intermediate sizes and depths of color are visible, even in a single cell.—Green and colorless plastids in the same or in different plants of chlorophyll types are

regarded as the end members of a continuous series which comprises also all intermediate stages in development. The cells of all chlorophyll types contain only 1 kind of primordium from which plastids arise. Differences appearing later are explained as being dependent upon functional rather than structural bases. The mode of origin of the proplastids could not be determined and the question as to whether they are permanent cell organs or may arise *denovo* is still unsettled. Proplastids have a distinct individuality after they are developed into chloroplasts. The relation of proplastids to chondriosomes and like structures is discussed. In maize strains in which the inherited characters are transmitted according to Mendelian rules, the behavior of the proplastids is thought to be at least in part under control of the nuclear mechanism. In strains in which the inheritance is non-Mendelian, no explanation is given.—*Wanda Weniger*.

197. SCHÜRHOFF, P. N. Die Teilung des vegetativen Pollenkerns bei *Eichornia crassipes*. [The division of the vegetative pollen nucleus in *Eichornia crassipes*.] Ber. Deutsch. Bot. Ges. 40: 60–63. Fig. 1. 1922.—Pollen grains almost always degenerate in the binucleate condition. Some, however, show a typical mitosis of the vegetative nucleus. Inasmuch as Smith found that the chromosomes never showed a V-formed figure in the nuclear division of the embryo-sac mother cell, Schürhoff concludes that no reduction division takes place in pollen mother cells and that the plant is oovogamous.—*R. M. Holman*.

198. SCHWARZE, CARL A. The method of cleavage in the sporangia of certain fungi. Mycologia 14: 143–172. Pl. 15–16, fig. A–F. 1922.—Cytological study of *Olpidiopsis Saprolegniae*, *Saprolegnia torulosa*, *Achlya*, *Sporodinia grandis*, *Mucor racemosus*, *M. mucedo*, *Circinella minor*, *Rhizopus nigricans*, and *Pilobolus crystallinus* shows that "cell-division in the sporangia of algae and fungi is essentially a process of furrowing either from the periphery of the sporangia or from the vacuoles in the interior of the spore plasm." Spore formation in certain fungi, (*Achlya* and *Saprolegnia*) "involves . . . a marked series of contraction and expansion phases" comparable to the oosphere formation in *Vaucheria* described by other investigators. "The process of spore formation may be much abbreviated, as in *Sporodinia grandis*, . . . or it may be protracted, as in *Pilobolus crystallinus*, . . . by the interpolation of an embryonic stage," the protospores. Columella formation is not initiated by a plane cross-wall but by a "dome-shaped mass of vacuoles at the inner boundary of the spore plasm."—*H. R. Rosen*.

199. SEARS, PAUL BIGELOW. Variations in cytology and gross morphology of *Taraxacum*. I. Cytology of *Taraxacum laevigatum*. Bot. Gaz. 73: 308–325. Pl. 9–10. 1922.—The mode of synaptic pairing and cytological variation in *Taraxacum laevigatum* are discussed. The earliest stages of maturation are marked by the presence of 13 paired prochromosomes. On entering synizesis the thread shows a partly paired, partly vacuolate—split—appearance; on emerging from synizesis it is distributed through the nucleus and a non-simultaneous splitting occurs. The formation of 26 univalent chromosomes occurs by lateral refusion of the 2 previously split halves.—After segmentation, diakinesis in *T. laevigatum* may develop further in any 1 of 4 ways, instead of in a uniform sequence as described for other parthenogenetic species of *Taraxacum*. In 1 sequence pairing is end to end following diakinesis and is prompt and complete, a heterotypic metaphase with 13 bivalents resulting. This almost typical reduction division was observed in pollen, but in the embryo sac it has been traced only through the compact orientation stage. Hundreds of embryo sacs failed to disclose tetrad formation, and it is not known whether true reduction occurs. A 2nd sequence, for which the name "ameiosis" is proposed, results in reproduction in that it insures preservation of constant chromosome equipment in the absence of fertilization. The nuclear membrane disappears before synapsis, synaptic pairing is end to end but takes place very slowly. The pairs, 13 in number, come to metaphase with components still end to end and transversely oriented. A quantitative division is brought about. This sequence occurs in pollen resulting in diads which as a rule do not undergo further growth. In the embryo sac a diad results in which the apical cell disintegrates, the basal cell developing into an 8-nucleate embryo sac by vegetative mitoses. The

3rd sequence found seems to bridge the gap between the 1st and 2nd. Pairing of univalents is variable, and premature elongation of the nucleus and defective orientation occur. This sequence is responsible for pollen abnormalities, the chromosomes never reaching the metaphase position and being reorganized into nuclei before those at the center reach the poles. A 4th sequence of amitosis is also responsible for pollen abnormalities. The nucleus elongates prematurely and the split thread persists after segmentation, giving 26 X- and Y-shaped chromosomes without a spindle.—The 4 sequences following segmentation give a new aspect to the previous hypotheses of maturation in parthenogenetic species of *Taraxacum*. The variations are traced to an increasing degree of inhibition of sex by chromosome individuality and polarity.—*Wanda Weniger*.

200. SÜSSENGUTH, K. Bemerkungen zur meiotischen und somatischen Kernteilung bei einigen Monokotylen. [Observations on meiotic and somatic nuclear division in monocotyledons.] *Flora* 114: 313-328. *Fig. 21*. 1921.—In the microsporocyte of *Rhoeo discolor* a continuous double spireme segments into 12 (diploid) split chromosomes, each of which resembles a tetrad because of a transverse constriction. In the heterotypic anaphase 6 of these bodies pass to each pole, and in the homoeotypic mitosis each divides along the plane of the split. Similar appearances are seen in *Thalia dealbata* and *Chamaedorea Karwinskiana*. The behavior of prochromosomes, the frequent pairing of chromosomes in somatic cells, and phenomena in apogamous forms are cited to support the view that somatic and heterotypic mitoses are essentially different in their later stages only. The double spireme of the prophase of both has the same diploid number of split chromosomes placed end-to-end. In somatic mitosis the longitudinal halves of each chromosome separate, so that each telophase nucleus contains 1 portion of every original chromosome. In heterotypic mitosis the halves do not separate, each telophase nucleus containing both portions of $\frac{1}{2}$ the original chromosomes. In both cases the telophase nucleus has the diploid number of daughter chromosomes. Numerical reduction occurs in the homoeotypic division, when the longitudinal halves (daughter chromosomes) finally separate.—*L. W. Sharp*.

201. SWEZY, OLIVE. Mitosis in the encysted stages of *Endamoeba coli* (Loesch). *Univ. California Publ. Zool.* 20: 313-332. *Pl. 29-31*. 1922.—In the encysted *Endamoeba coli* cells, 3 and sometimes 4 successive mitotic divisions occur, resulting in 8 or more nuclei. After fixation the cytoplasm contains much glycogen in the form of 1 or more large masses and a number of slender chromatoid bodies; both represent food reserves used up during the mitoses.—The nucleus has an excentric karyosome and a number of scattered chromatin granules on the linin reticulum and nuclear membrane. The chromosomes are probably 6 in number and split before the spindle is formed. Intranuclear polar masses or centrosomes are formed by division of a part of the karyosome; they remain connected by an intradesmose, and between them the spindle is formed. After the daughter chromosomes separate irregularly the elongated nucleus constricts between the telophase groups and divides into daughter nuclei; the nuclear membrane persists throughout the entire process. There is probably a complete nuclear reconstruction before the next mitosis, the polar mass probably becoming the karyosome, and the chromatin becoming distributed on the linin reticulum and nuclear membrane. The division of the protoplasmic body has not been observed.—*L. W. Sharp*.

202. TERBY, JEANNE. La constance du nombre des chromosomes et de leurs dimensions dans le *Butomus umbellatus*. [The constancy of the number and dimensions of the chromosomes in *Butomus umbellatus*.] *La Cellule* 32: 197-225. *Pl. 2*. 1922.—The chromosomes in the somatic cells are 40 in number and fall into 6 size groups, as follows: group I, 6 chromosomes, 275-325 μ in length; group II, 4 chromosomes, about 200 μ ; group III, 2 chromosomes, 150 μ ; group IV, chromosomes, 100-125 μ ; group V, 20 chromosomes, 75-100 μ ; group VI, 4 chromosomes, about 50 μ . The constancy of such a high number of chromosomes affords further support to the individuality theory, while the constancy of the characteristic dimensions is indicative of qualitative differences among the chromosomes.—*L. W. Sharp*.

ECOLOGY

H. C. COWLES, *Editor*GEO. D. FULLER, *Assistant Editor*

(See also in this issue Entries 22, 33, 48, 56, 70, 79, 85, 111, 334, 336, 353, 355, 376, 388, 391, 437, 443, 444, 452, 512, 540, 544, 545, 546, 547, 548, 549, 558, 559, 560, 561, 573, 574, 577, 578, 580, 584, 585, 586, 721, 758, 759, 760, 761, 765, 814, 815, 829, 831, 882, 885, 887, 888, 889, 890, 891, 892, 893, 894, 896, 897, 898, 906, 907, 909, 910, 911, 912, 914, 915, 920, 921, 922, 924, 925)

GENERAL, FACTORS, MEASUREMENTS

203. ANONYMOUS. [Climatic maps of Maryland and Delaware.] 1921.—The Maryland State Weather Service in cooperation with the U. S. Weather Bureau, the Johns Hopkins University, and the University of Maryland has published 3 colored maps (each 81.5 × 47 cm.) of Maryland and Delaware. The "Blue" map indicates average annual precipitation, the "Red" map average annual temperature, and the "Green" the growing season or "the average number of days intervening between the date of the last freezing temperature in the spring and the date of first freezing temperature in the fall." For the entire state of Maryland the average annual precipitation is approximately 42 inches with an average annual maximum of 52 and minimum of 34 inches. The average annual temperature is 54°F. with an average annual maximum of 58 and minimum of 46. The average growing season is 185 days with 120 and 230 days as extremes.—*Earl S. Johnston.*

204. ANONYMOUS. Important peat deposit near La Paz (Bolivia). *Jour. Amer. Peat Soc.* 14: 28. 1921.

205. ADAMS, CHARLES C., G. P. BURNS, T. L. HANKINSON, BARRINGTON MOORE, and NORMAN TAYLOR. Plants and animals of Mount Marcy, New York, Part I. *Ecology* 1: 71-94. 1920.—In this account of a cooperative study of the timber-line vegetation and the accompanying animal life on Mount Marcy, New York, a general statement of the topographic and geologic relations of the Adirondacks, the climatic conditions of Mount Marcy, and the general aspects of the plant and animal life of the region, is followed by a more detailed account of the instrumental data obtained at 4 stations located at critical points in the vegetative covering of the mountain. The 4 stations chosen were: (a) lower limit of fir forest at 4,250 feet; (b) bog at Tear Lake, at 4,320 feet; (c) dwarf fir forest at 4,890 feet, in the tree crowns and on the ground; and (d) alpine zone above timber line at 4,920 feet. The data concern principally the evaporation, solar radiation, temperature of air, temperature of soil, and analyses of soils at each of these stations.—*Charles A. Shull.*

206. BHIDE, R. K. Drought resisting plants in the Deccan. *Jour. Indian Bot.* 2: 27-43. 1 pl. 1921.—Unusually severe drought in 1918-19 gave opportunity to study drought resistance in many trees, shrubs, and herbaceous perennials. Available moisture in the soil about the roots (determined by drying the soil to constant weight over a sand bath at 45-50°C.) ranged from 0.8 to 3.5 per cent, depending on the character of the soil. As a result of the severe drought most of the herbaceous plants showed decrease in the length and number of branches, decrease in size, and increase in hairiness of leaves, and, apparently, decrease in number of rootlets. Strong storage tap roots are characteristic of these plants.—*Winfield Dudgeon.*

207. COCKERELL, T. D. A. Natural history of Porto Santo. *Nature* 107: 10-11. 1921.—This brief description (chiefly zoological) concerns an island of the Madeira group.—*O. A. Stevens.*

208. DUFRÉNOY, JEAN. Influence de la température des eaux thermales de Luchon sur leur flore. [The influence of temperature of the water on the flora of Luchon.] *Compt.*

Rend. Acad. Sci. Paris 172: 612-614. Fig. 10-14. 1921.—A thermic classification of the waters of Luchon, which are high in sulphur and assimilable iron, corresponds closely to the biological classification according to the mode of symbiosis of the reducing bacteria with the iron and sulphur-oxidizing bacteria. The temperature determines the aspect of the flora.—Filamentous iron bacteria prefer cool and tepid waters; the globular forms (*Siderocapsa*) are ubiquitous and tolerate 43°C. The sulphur-producing types (*Beggiatoa*) live in cool water. *Thiothrix* tolerates 50°C. Only those Thiobacteria of very small diameter endure very hot waters. The formation of sulphur is especially intense between 40 and 50°C., although it is always active.—E. T. Foëx.

209. HELDT, H. Croisière de la Perche en Méditerranée. Détail des opérations. [Cruise of the "Perche" in the Mediterranean. Particulars of the operations.] Bull. Inst. Oceanograph. Monaco 389. 15 p. 1921.—Water conditions are given where fish and plankton were collected.—T. C. Frye.

210. LIVINGSTON, BURTON E., and FORREST SHREVE. The distribution of vegetation in the United States, as related to climatic conditions. Carnegie Inst. Washington Publ. 284. xvi + 590 p., 73 pl. (2 colored), 74 fig. 1921.—This book presents studies that occupied the authors for over 10 years, the results being mainly of a quantitative kind. These studies are based on the principle that the control of plant distribution is largely physiological, that all ecological observations must ultimately be expressed in terms of the physiological processes of the individual plants dealt with. The publication constitutes an attempt to correlate the distribution of the vegetation of the areas studied with the distribution of some of the climatic features that seem most important to plants.—Part I is on the distribution of the vegetation, and is illustrated by 33 charts. The 1st of these is a rather detailed map of the vegetation areas of the U. S. A. The areas considered are: (1) California microphyll desert, (2) Great Basin microphyll desert, (3) Texas semi-desert, (4) Arizona succulent desert, (5) Texas succulent desert, (6) Pacific semi-desert, (7) desert-grassland transition, (8) grassland, (9) grassland-deciduous-forest transition, (10) deciduous forest, (11) southeastern evergreen-deciduous transition forest, (12) southeastern mesophytic evergreen forest, (13) northeastern evergreen-deciduous transition forest, (14) northern mesophytic evergreen forest, (15) western xerophytic evergreen forest, (16) northwestern hygrophytic evergreen forest, (17) alpine summits, and (18) swamps and marshes. Plate 1 is followed by a generalized vegetation chart which depicts the vegetation as 9 areas: desert, semi-desert, grassland, grassland-deciduous-forest transition, deciduous forest, northwestern hygrophytic evergreen forest, southeastern mesophytic evergreen forest, northern mesophytic evergreen forest (west), northern mesophytic evergreen forest (east). This chart forms the base for many of the later charts. Plates 2-33 show vegetation features. Three of these present the various degrees of density in the distribution of 3 selected species. Seventy selected species are charted on 23 plates as to the geographical limits of their distributional areas.—Part II deals with the environmental conditions for plant life in the U. S. A. The physiology of conditional control is first somewhat thoroughly presented, after which the main environmental conditions of the U. S. A. are shown by 39 climatic charts, with full tables of data and discussions. Plate 34 deals with the length of the average frostless season. Plates 35 to 45 are charts showing as many different indices of temperature conditions, many of which are derived by new methods. Plates 46-52 deal with precipitation indices, many of which are new. Plates 53-56 present evaporation indices, including those obtained by porous-cup atmometry in 1908. Precipitation-evaporation ratios are presented by the charts of plates 57-62. Two charts (63 and 64) deal with aqueous-vapor pressure and 3 (65-67) with relative air humidity. One chart (68) presents indices of wind velocity and 1 (69) deals with sunshine duration. Moisture-temperature indices are presented by 3 charts (70-72). Plate 73 is a reproduction in colors of Merriam's chart of life zones. Special attention is given to the several temperature and moisture provinces of the U. S. A. and to the charting of the area of this country by means of those 2 criteria.—Part III presents the results of an elaborate attempt to correlate the 32 vegetational charts with the 39 climatic ones. A new kind of quantitative climatic description for each vegetational area is

obtained, these being shown by 130 tables and 53 diagrams. This part of the book represents a very extensive study of the relations holding between the sizes, shapes, and geographic locations of the several vegetational areas and the climatic index values that are shown as belonging to these areas.—*B. E. Livingston.*

211. MOORE, BARRINGTON. The relative length of day and night. *Ecology* 1: 234-237. 1920.—A general review is made of the subject, mentioning a number of contributions to our knowledge of the influence of light upon plant growth and reproduction. Special attention is given to Garner and Allard's work [see *Bot. Absts.* 5, Entry 22], the author pointing out the bearing of their experiments on problems of plant distribution. Suggestions are made for a study of the flowering period of plants in different latitudes, and the author thinks that possibly the same influence has a direct bearing on periodic hibernation and migration of animals.—*Charles A. Shull.*

212. OYE, P. VAN. Influence des facteurs climatiques sur la répartition des épiphytes à la surface des troncs d'arbres à Java. [Influence of climatic factors on the occurrence of epiphytes on the surface of tree-trunks in Java.] *Rev. Gén. Bot.* 33: 161-176. 1921.—The occurrence of epiphytes on tree trunks in the Dutch Indies depends chiefly on light and humidity. For *Trentepohlia* the influence of light is preponderating. The lichens develop where the atmosphere is dry and light. Mosses are found in situations having rather humid atmospheres. *Drymoglossum* was influenced by both light and humidity, usually favoring the south side of the trees. The observations were made at Tasikmalaya, at an altitude of 350-400 m.—*J. C. Gilman.*

213. PEARSON, G. A. Factors controlling the distribution of forest types. Part I. *Ecology* 1: 139-159. 8 fig. 1920.—An account of the factors controlling forest distribution in the San Francisco Mountains of Arizona is given. Five forest associations are considered, the pinon-juniper, yellow pine, Douglas fir, Engelmann spruce, and alpine. The climatic factors discussed are temperature, precipitation, wind, and evaporation. Detailed analyses of the data are presented. The origin and general character of the soil, the available soil moisture, and soil temperatures are the edaphic factors presented.—*Charles A. Shull.*

214. RUSSELL, E. J., and E. H. RICHARDS. The amount and composition of rain falling at Rothamsted. [Based on analyses made by the late Norman H. J. Miller.] *Jour. Agric. Sci.* 9: 309-337. 1919.—Analyses of rainwater for the 10 years 1905 to 1915 are given, with discussion of the data from 1870.—*D. Reddick.*

215. SCHMID, GÜNTHER. *Centaurium pulchellum* (Druce) Sw. auf Bittersalzboden. [Centaurium pulchellum in soil rich in magnesium sulphate.] *Ber. Deutsch. Bot. Ges.* 38: 58-68. Fig. 1. 1920.—In the vicinity of Jena below the "Sophienhöhe," gypsum and dolomite are closely associated and as a result magnesium sulphate has been formed. On shallow soil formed by the weathering of rock and containing at least 10 per cent magnesium sulphate in addition to a large quantity of calcium sulphate, the author found a group of somewhat more than 100 dwarf plants of *Centaurium pulchellum* (*Erythraea pulchella* Fries), each with a single flower. The plant, which corresponds closely to the variety *palustre* Schinz et The llung, has not previously been reported from Thuringia. The author discusses the causes of the rarity in central Europe of areas where the soil is rich in magnesium sulphate. The dimensions of the dwarf plants and their different organs are presented in a table together with corresponding measurements of normal plants found in the same vicinity on soil containing much less of the salt. The normally pentamerous flowers are, in the dwarf plants, for the most part tetramerous; this tendency toward tetramery is more marked in the smaller plants. The small size, absence of branching, production of but 1 flower on a plant, and tendency to tetramery in the dwarf plants are interpreted as expressions of unfavorable conditions for nutrition.—*R. M. Holman.*

216. SEARS, PAUL B. **Vegetation mapping.** *Science* 53: 325-327. 1921.—Two suggestions are here presented. The 1st is a statement of the practical use of a set of symbols to represent genera of plants as transcribed from surveyors' field notes to maps; a workable map results. One concrete instance of its use in the Erie Basin of Ohio is described in some detail.—The 2nd suggestion has to do with the use of the airplane in sketching the various areas of vegetation types. From the airplane these types are distinct and can be comfortably sketched to form the basis of field studies and to serve as a check on final conclusions. The methods were tested in flights made at Arcadia, Florida.—*C. J. Lyon.*

217. SHULL, CHARLES A. **Evaporation in Kansas.** *Trans. Kansas Acad. Sci.* 29: 118-130. *Pl. 1-15.* 1920.—A comparison is made of the evaporation and rainfall at Lawrence and Tribune, Kansas, during parts of 1916 and 1917.—*F. C. Gates.*

218. THOULET, J. **Circulation océanique. Densités in situ et indices de réfraction. [Oceanic circulation. Densities in situ and indices of refraction.]** *Bull. Inst. Oceanograph. Monaco* 394. 26 p. 1921.

219. THOULET, M. J. **Sur la mesure directe des courants marins superficiels et profonds. [On the direct measurement of surface and deep marine currents.]** *Bull. Inst. Oceanograph. Monaco* 393. 4 p. 1921.

220. VAURABOURG, C. **La détermination de la densité de l'eau de mer par la mesure de l'indice de réfraction. [The determination of the density of sea water by the measure of the index of refraction.]** *Bull. Inst. Oceanograph. Monaco* 395. 27-47. 1921.

221. WHERRY, EDGAR T. **Soil acidity and a field method for its measurement.** *Ecology* 1: 160-173. 1920.—The author discusses the ways in which hydrogen ions may be produced in soils, a method of recognizing the cause of soil acidity, and describes the process of making indicator field tests for soil acidity. A color chart is included.—*Charles A. Shull.*

STRUCTURE, BEHAVIOR, SYMBIOSIS

222. ANONYMOUS. **Floral fireworks.** *Sci. Amer. Monthly* 3: 120. 1 fig. 1921.—A brief account is given of some of the methods of spore and seed distribution.—*Chas. H. Otis.*

223. BAILEY, IRVING W. **Some relations between ants and fungi.** *Ecology* 1: 174-189. 3 pl. 1920.—A number of species of myrmecophytes have been studied with special reference to the relations existing between the fungi found growing in the cavities inhabited by the ants, and the ants themselves. The growth and sporadic distribution of the fungi suggest that they are adventitious rather than cultivated by the ants. Investigation of the pellets found in the infrabuccal cavities of the worker ants showed that there is a general tendency among ants to take spores and fragments of mycelia into these cavities. The author believes that this infrabuccal sac serves mainly as a receptacle for food-residues and detritus rather than as a receptacle for food. The spores and fungi found in the cavity may be looked upon as detritus since the crops and stomachs of the ants never show spores or fragments of hyphae among their contents. While the ants are closely associated with fungi, the data presented do not indicate that the Formicidae other than the Attii, are fungivorous. The pure cultures of fungi often found in such ant homes may be the result of natural selection permitting one form to become dominant, after which it is transferred to new nests by the queens. The Formicidae are probably active agents in disseminating fungi, especially in the tropics. There is a brief discussion of the origin of fungus-growing and fungus-feeding habits of ants.—*Charles A. Shull.*

224. BUTLER, H. **Dendrobium linguiforme.** *Australian Nat.* 4: 207. 1921.—The structure of its leaf is regarded as explaining its xerophytic habitat.—*T. C. Frye.*

225. BUTLER, H. *Erythrina indica*. Australian Nat. 4: 206. 1921.—It is suggested that the species does not fruit in the vicinity of Sydney because a species of bird extracts the nectar by perforating the base of the flower.—T. C. Frye.

226. FORREST, GEORGE. A lecture on recent discoveries of rhododendrons in China. Rhododendron Soc. Notes 2: 3-23. 1920 [1921].—The author, who has spent 10 years in the botanical exploration of southwestern China, gives an account of his discoveries as they concern the genus *Rhododendron*. Introductory remarks on the topography and geology of the region are followed by notes on the environment, the habit, the flowers, and other obvious characters of a large number of species, many of them shown by lantern-slides in the course of the lecture. After the conclusion of the lecture I. B. BALFOUR made some remarks on the phylogenetic development of the genus and attributed its remarkable segregation in that region chiefly to the diversified climatic conditions. He further spoke on the relationship of the rhododendrons of these regions to lime in the soil and particularly on the important discovery of Forrest that the nitrogen-supplying mycorrhiza, which does not flourish in limestone soil, is replaced by a mycophyllon,—a fungus mycelium growing on the under side of the leaves and probably absorbing free nitrogen from the atmosphere and making it available to the rhododendron.—Alfred Rehder.

227. FORSAITH, C. C. Anatomical reduction in some alpine plants. Ecology 1: 124-134. 1920.—A study of the anatomy of *Betula glandulosa* Michx., *B. alba* var. *cordifolia* (Regel) Fernald, *Alnus crispa* (Ait.) Pursh, and *Rhododendron lapponicum* (L.) Wahlenb. from near timberline on the Presidential Range in New Hampshire, as compared with the anatomy of allied species from lower elevations, reveals a marked reduction of the medullary ray storage tissue in the alpine forms. In *Betula* and *Alnus* the rays are usually reduced to a uniseriate condition, and the compound rays of *Rhododendron* are markedly reduced. The reduction is believed due to the alpine climate. As the general trend of evolution of anatomy in these genera appears to be toward simplified rays, the notable reduction in alpine species seems to indicate that the severe conditions of alpine life cause a more rapid phylogenetic progress than occurs in sheltered lowland species.—Charles A. Shull.

228. GOOR, A. C. J. VAN. Das Wachstum der *Zostera marina* L. [The growth of *Zostera marina*.] Ber. Deutsch. Bot. Ges. 38: 187-192. 1920.—The author presents measurements, taken at 7 stations in the Watten Sea along the Dutch Coast over a period of 15 months, of minimum, maximum, and mean leaf width and length of the longest leaves of a large number of *Zostera* plants, of which the mean number of leaves is also given. The increase in leaf number by the development of new leaves, the decrease through dying off of old leaves, the growth of the new leaves in length and width, and the relation of these changes to the seasons of the year are discussed.—R. M. Holman.

229. HARRISON, J. W. HESLOP. The colors of primroses. Nature 107: 359-360. 1921.—Red-flowered forms transferred from one locality at 1,500 feet elevation to near sea-level produced red flowers the 1st year, but normal yellow ones thereafter. From another station at 1,000 feet the red was retained. Among hundreds of primrose-cowslip hybrids the author has never seen similar plants. The pollinating insect is *Bomblyllus major*.—O. A. Stevens.

230. HAVILAND, F. E. Some notes on *Kochia villosa*, Lind.: var. *tenuifolia*, F. v. M. Australian Nat. 4: 205-206. 1920.—Foliage and pollination are discussed from an ecological point of view.—T. C. Frye.

231. KLUGH, A. BROOKER. Nature's diary. Farmer's Advocate 56: 648. 1921.—*Hepatica* does not secrete nectar, but insects visit the flowers to obtain pollen.—F. W. L. Sladen.

232. LOWE, H. J. Bees and scarlet runner beans. Nature 107: 684. 1921.—The writer has previously reported [Nature 105: 742. 1920] bumble bees regularly puncturing the base of

the flower to obtain the nectar. In 1921 they did not. He suggests that the dry season has decreased the depth of the flower and perhaps hardened the calyx, making it more difficult to penetrate.—O. A. Stevens.

233. PERRYCOSTE, F. H. The colors of primroses. *Nature* 107: 459. 1921.—On the island of Sark an abundance of white, pink, and red primroses occur. Red could not have been due to altitude.—O. A. Stevens.

VEGETATION

234. ADAMS, CHARLES C., GEORGE P. BURNS, T. L. HANKINSON, BARRINGTON MOORE, and NORMAN TAYLOR. Plants and animals of Mount Marcy, New York. Part II. Ecology 1: 204-233. 6 fig. 1920.—Part II of this paper deals with the ecological relationships of the animals and plants of Mount Marcy. The fir forest is continuous over the slopes of Mount Marcy except for a bog at Tear Lake and the alpine summit. Conditions at the lower limit of the fir forest (4,250 feet) are described, with a list of plants in order of frequency. The vertebrate fauna, especially the birds, is listed and conditions favorable for animal life are discussed. The conditions at Tear Lake, the source of the Hudson River, are presented in detail, many plants and invertebrate animals being listed. The dwarf fir forest just below timber line (4,890 feet) is marked off abruptly from the alpine fell-field, and at timber line the trees are 7-12 feet tall. The undergrowth is made up mainly of mosses, with *Oralis acetosella* and a few other herbs among them. The forest is so dense that no true alpine plants penetrate through the timber-line barrier. Some invertebrates are mentioned from this forest, and a number of birds, with the plants that yield them food. The alpine zone receives major consideration. The succession is traced from the pioneer lichens to the climax vegetation of the alpine summit. A description is given of a dwarf birch meadow in which lowland species have pushed into the alpine zone. Another meadow on the south east side of the mountain (5,100 feet) shows a remarkable intrusion of lowland species into the alpine region. Invasion from above downward is found only at Tear Lake, but lowland species do not similarly find timber line a barrier to their distribution.—Charles A. Skull.

235. ANNANDALE, N., and H. G. CARTER. Notes on the vegetation of Seistan. *Jour. Asiatic Soc. Bengal* 16: 267-297. Pl. 4. 1919.—Plants collected at Seistan on the Persian frontier of Afghanistan and Baluchistan are listed, with an ecological discussion of the various types of vegetation observed: the stony desert, banks of saline streams, alluvium, sand dunes, etc.—E. D. Merrill.

236. ASTRE, GASTON. Contribution à l'étude de la répartition des zones biologiques sur les dunes méditerranéennes du golfe du Lion. [Contribution to the study of the distribution of the biological zones of the Mediterranean dunes of the Gulf of Lyons.] *Compt. Rend. Acad. Sci. Paris* 172: 1120-1123. 1921.—The author replies to a recent paper by Kühnholtz-Lordat [see Bot. Absts. 12, Entry 240]. The region is divided into 4 zones according to the general classification of dune areas made by the author, namely: abiotic, oligobiotic, mesobiotic, and pleistobiotic. The 1st is free from plants; the 2nd is characterized by *Ammophila arenaria* almost exclusively; the mesobiotic has in addition *Teucrium* and *Ephedra*; and the pleistobiotic is characterized by the presence of many plants.—C. H. Farr.

237. DWYER, J. W. A floral survey of the southwestern slopes of N. S. Wales round about Temora and Barmedman. *Australian Nat.* 4: 212-224. 1921.—A list of the plants by families is given with some remarks on their habitats.—T. C. Frye.

238. HAMILTON, A. A. An ecological study of the saltmarsh vegetation in the Port Jackson District. *Proc. Linn. Soc. New South Wales* 44: 463-513. Pl. 17-30. 1919 [1920].—A critical survey, based on detailed observations of the behavior of the vegetation of a definite area is given. The flora shows representative, successful, xerophytic modifications such as succulence, special breathing organs, glossy leaf surfaces, or reduced, cutinised, or vertically set leaves, shallow rooting, or massed arrangement, as means for resisting the principal factors

considered, namely; salinity of soil, intense insolation, imperfect drainage, and tidal and stream movements. The manner of formation of the marshes, their zonation, the means of seed distribution, the different groups of plants represented, their succession, and the part each plays in land formation are described. The scarcity of mosses and of rosette- and bulb-forming species, and the lack of bright colored flowers (associated with the wind pollination—found chiefly—instead of insect pollination) and fruits were noted in contrast with the bright flowered xerophytes of the sandstone hills. Red, as compared with green, *Salicornia* stems were present in all tufts and at all seasons but were least so in summer. The danger of mistaking the ecologic responses of a species for different species or varieties is pointed out. The formations discussed were (1) tide-flood zone, (2) a dry salt plain, and (3) fluvial zone.—*Eloise Gerry.*

239. HARPER, ROLAND M. The limestone prairies of Wilcox Co., Alabama. *Ecology* 1: 198–203. 2 fig. 1920.—A general discussion of the limestone soils of Wilcox county is accompanied by a list of the commonest species of plants found in the natural prairies.—*Charles A. Shull.*

240. KÜHNHOLTZ-LORDAT, G. Phytogéographie dynamique des dunes du golfe du Lion. [Dynamic plant-geography of the dunes of the Gulf of Lyons.] *Compt. Rend. Acad. Sci. Paris* 172: 865–868. 1921.—The dunes are rarely 60 m. wide and a maximum of 8 m. high. A triple dynamic action of wind, sand, and obstacles is involved. Plants, especially *Ammophila arenaria*, are concerned in the building of the dunes, and *Teucrium Polium* and *Ephedra distachya* are especially involved in conserving them. [See also Bot. Absts. 12, Entry 236.]—*C. H. Farr.*

241. MALTA, N. Oekologische und floristische Studien über Granitblockmoose in Lettland. [Ecologic-floristic studies of the mosses of granitic erratics in Latvia.] *Latvijas Augstskolas Raksti* [Acta Univ. Latviensis] 1: 108–124. 1921.—This article deals with mosses of Livonia and Kurland. Granitic erratics are interesting floristically because of the presence of montane species in the lowlands; ecologically, in the small, restricted, and unvarying character of the substratum they furnish, permitting easy recognition of the influence of climatic and other factors as well as facilitating study of changes in conditions produced by layers of humus, soil, shade, and moisture. Even very thin layers of humus cause such erratics to lose completely their distinctive character, hence care is necessary to distinguish the genuine granitic flora from that which has overrun the blocks.—In dry, sunny situations free from disturbance by men or cattle, the moss cover of granite blocks changes but little in the course of many years, even when the plant covering of the surrounding soil is greatly altered. Colonization of bare blocks proceeds from scattered plants finding lodgment in dust-filled depressions; speed is correlated with roughness of surface; lichens preceded mosses on smooth rocks. Various species of Grimmiaceae form the most conspicuous association covering rocks in open, sunny places; a 2nd well-defined association occurs on blocks in the shade of bushes; a 3rd, in the deeper shade of woods. The moisture factor is closely related to that of shade, but there is a well-defined hygrophytic association independent of the shade. Lists of species for each association are given. The article closes with an annotated list of 13 hepatics and 96 mosses which occur on granitic erratic blocks. A bibliography of 10 titles follows.—*E. B. Chamberlain.*

242. METCALF, Z. P. Some ecological aspects of the tidal zone of the North Carolina coast. *Ecology* 1: 193–197. 1920.—The paper deals principally with animals, but reference is made to several unnamed species of grasses and to *Uniola paniculata*, which occur on the tidal zone of the North Carolina coast.—*Charles A. Shull.*

243. NEEDHAM, J. G. A biological examination of Lake George, N. Y. *Sci. Monthly* 12: 434–438. 1921.—The water is "soft," and the dominant plants and lesser animals differ from those in other lakes in central New York. The most abundant plant is *Nitella opaca*, occurring at depths between 18 and 45 feet and covering scores, if not hundreds, of acres of the lake bed;

it is often 3-4 feet long, and is called grass locally. *N. batrachosperma* (at 5-foot depths) and 2 species of *Chara* are also present. Below the *Nitella* zone is the abundant siphon alga, *Dichotomosiphon*, at 40-50-foot depths. *Cladophora* is in the deep, dark areas. On the shore, *Tolypothrix* fairly covers the submerged stones. *Elodea* and hornwort are scarce. *Potamogeton praelongus* forms the most beautiful weed beds of the lake at 10-15 feet. Four genera of diatoms and other less abundant algae were found. Certain especially favorable collecting grounds are noted as are the small animals associated with certain plants.—*L. Pace*.

244. PEATTIE, DONALD C. An interesting habitat. *Rhodora* 23: 69-71. 1921.—A description is given of the flora and the habitat of an association for which the author proposes the name "Grotto," because of its resemblance to that physiographic feature. This habitat consists in a face or precipice of rock with frequently a sloping shelf below, and a continual seepage of water down the upper rock on to the lower. Owing to this seepage it is essentially a hydrophytic habitat yet an aerial one. An association of this type is detailed as it occurs in the Blue Ridge in North Carolina, and its annual cycle is described.—*James P. Poole*.

245. SOPER, J. DEWEY. Notes on the mammals of Ridout, District of Sudbury, Ontario. *Canadian Field Nat.* 34: 61. 1920.—The habitats of the local forest trees are briefly described.—*W. H. Emig*.

FLORISTICS

246. ANONYMOUS. Exhibit of National Herbarium specimens. *Proc. Linn. Soc. New South Wales* 45: 318-319. 1920.—*Eupatorium glandulosum* H. B. & K. and *Crepis setosa* Hall. were exhibited. The 1st is a native of Mexico, a garden escape, which has become well established in certain localities at sea level. The 2nd is a native of Europe and Asia Minor recorded for the 1st time in Australia. A seed of *Butia yatay* Becc. (*Cocos yatay* Mart.) which produced twin seedlings was exhibited. References to other cases of polyembryony are given.—*Eloise Gerry*.

247. BENNETT, ARTHUR. *Silene conica* L. in Carmarthenshire. *Jour. Botany* 59: 205-206. 1921.

248. CALVERT, E. W. Notes on the fauna and flora of East and Middle Sister and North Harbor Islands, Lake Erie. *Canadian Field Nat.* 34: 109-110. 1920.—A few of the more common trees are mentioned.—*W. H. Emig*.

249. COBAU, R. Flora vasculare spontanea della citta di Milane. [Flora of vascular plants of Milan.] *Nuova Gior. Bot. Ital.* 27: 89-128. 1920.

250. CULMANN, P. Muscinées spéciales à l'Auvergne. [Bryophytes peculiar to the Auvergne.] *Rev. Bryologique* 47: 65-69. 1920.—According to Héribaud there are 32 species of bryophytes, 13 hepatics and 19 mosses, which are restricted in France to the region of the Auvergne. The author shows that these numbers are much too high. On the basis of citations from the literature he is able to reduce them materially and expresses the opinion that the total number will hardly exceed half a dozen when the distribution of the bryophytes in France is more completely known.—*A. W. Evans*.

251. DESMIER, M. G. *Stereodon Haldani* Lindberg et *Alicularia compressa* (Hooker) Nees: deux nouveautés bryologiques pour la flore vosgienne. [Stereodon Haldani and Alicularia compressa, two bryophytes new to the Vosges Mountains.] *Bull. Soc. Bot. France* 66: 371-373. 1919.

252. DESPARTY, M. M. Nouvelles localités de plantes observées dans les cantons de Corbeil-Sud, de Milly-Nord (Seine-et-Oise) et de Melieu-Ouest (Seine-et-Marne). [New stations of plants found in the cantons of South Corbeil, North Milly (Seine-et-Oise) and West

Melun (Seine-et-Marne).] Bull. Soc. Bot. France 66: 334-338. 1919.—In this 2nd list 55 genera and 66 species are named.—A. Gershoy.

253. D[UNN], S. T. [Rev. of: GAMBLE, J. S. The flora of Madras, III. Kew Bull. 1920: 49-57. 1920 (see Bot. Absts. 7, Entry 2202).] Kew Bull. 1920: 75. 1920.

254. FARRER, REGINALD. Second expedition in Asia. (Cont.) The Akhyang Valley. Gard. Chron. 69: 162. Fig. 70. 1921.—A narration of the expedition is given with brief descriptions of the most interesting and attractive vegetation encountered. Earlier articles, published in 1919, 1920, and 1921, are listed.—P. L. Ricker.

255. FISCHER, C. E. C. Miscellaneous notes. Jour. Indian Bot. 2: 57-58. 1921.—New localities are recorded in peninsular India for *Pyrenacantha volubilis* Hook. and *Scoparia dulcis* L.—Winfield Dudgeon.

256. FLEISCHER, M. [Rev. of: MALTA, N. Beiträge zur Moosflora des Gouvernements Pleskau mit besonderer Berücksichtigung des Kalksteingebietes der Welikajamündung. (Contributions to the moss flora of the Government Pskov, with special reference to the limestone region at the mouth of the Velikaia River.) 78 p., 12 fig. Riga, 1919 (see Bot. Absts. 8, Entry 453).] Hedwigia 52: (Beiblatt) 30, 31. 1920.—The reviewer is inclined to confirm the author's statement that *Mnium hornum*, *Aulacomnium androgynum*, and *Grimmia pulvinata* reach their eastern limit in the Velikaia region and adds that *Pseudoscleropodium* (*Hypnum*) *purum* has a similar eastern limit.—A. W. Evans.

257. F[YSON], P. F. [Rev. of: HITCHCOCK, A. S. Floral aspects of the Hawaiian Islands. Ann. Rept. Smithsonian Inst. 1917: 449. 1919.] Jour. Indian Bot. 2: 152-153. 1921.

258. F[YSON], P. F. [Rev. of: WILSON, E. H. Notes from Australasia No. 1. Jour. Arnold Arboretum 2: 160-163. 1921.] Jour. Indian Bot. 2: 153-154. 1921.

259. HANSON, HERBERT C. Distribution of the Malvaceae in southern and western Texas. Amer. Jour. Bot. 8: 192-206. Fig. 1. 1921.—The geographical and ecological distribution of the Malvaceae in southeastern and in western Texas was studied; 66 species were found, 32 in the semi-tropical Gulf Strip, 4 in a small area of the Austroriparian, 35 in the Lower Sonoran, and 22 in the Upper Sonoran. Semi-tropical species of limited distribution are: *Bastardia viscosa*, *Malachra capitata*, *Abutilon pedunculare*, *A. jacquini*, *A. triquetrum*, *Wisadula periplocifolia*, and *Cienfuegosia sulphurea*. Western species of decidedly xerophytic type are: *Disella* spp., *Sphaeralcea* spp., *Sida* spp., *Abutilon malacum*, *Hibiscus denudatus* var. *involutus*, *H. Coulteri*, *Malvastrum coccineum*, and *M. elatum*. Eastern mesophytic species are: *Hibiscus lasiocarpus*, *H. militaris*, and *Kosteletzkya althacifolia*. Species of very wide distribution are: *Callirhoe involucrata*, *Malvastrum americanum*, *Malva parviflora*, *Sida diffusa*, *S. spinosa*, *S. hastata*, *Abutilon incanum*, and *Malvaviscus Drummondii*.—E. W. Sinnott.

260. KASHYAP, SHIV RAM. Notes on the distribution of liverworts in the western Himalayas, Ladak and Kashmir. Jour. Indian Bot. 2: 80-83. 1921.—Fourteen species were found in Jammu State, the surprisingly small number of 5 in the Kashmir Valley, and only 2 beyond the Himalayas north of Kashmir Valley. These observations bear out the previous conclusion of the author that in the Himalayas the number of species and individuals of liverworts decrease (1) in passing from east to west, (2) from south to north, and (3) from lower to higher altitudes.—Winfield Dudgeon.

261. MOUSLEY, H. Further notes on the orchids of Hatley, Stanstead County, Quebec, 1920. Canadian Field Nat. 34: 169-173. 1920.—Three additional species of orchids were found in the vicinity of Hatley. This brings the total number of species in this region to 33.—W. H. Enig.

262. PALMER, ERNEST J. *Botanical reconnaissance of southern Illinois*. Jour. Arnold Arboretum 2: 129-153. 1921.—The author states that the flora of southern Illinois contains many elements of the flora of the Gulf Coastal Plain, which extends at this point farther north than anywhere else in the continental interior. This fact is explained by the extension of the embayment of the Gulf of Mexico northward to southern Illinois up to the end of the Tertiary period and even later. The uplift of the Ozark plateau and the obliteration of the embayment caused great changes in the vegetation, but part of the original flora persisted in favorable localities. The plant associations of the different geological formations are given and the prominent species enumerated. A list of the ligneous plants observed with notes on their distribution, habitat, and habit concludes the article.—*Alfred Rehder*.

263. POTIER DE LA VARDE, R. *Bartramia stricta* Brid. sur le littoral de la Manche. [*Bartramia stricta* on the coast of the Manche.] Rev. Bryologique 47: 73. 1920.—The author reports his discovery of *Bartramia stricta* at St-Jean-le-Thomas, in the department of the Manche, France. The species is predominantly southern in its distribution, and its occurrence so far north is attributed to unusually favorable environmental conditions.—*A. W. Evans*.

264. RIDDELSDELL, H. J. *Draba muralis* in Gloucestershire. Jour. Botany 59: 180. 1921.

265. RÖLL, JULIUS. *Dritter Beitrag zur Torfmoosflora der Rhön*. [Third contribution to the peat moss flora of the Rhön.] Hedwigia 62: 155-162. 1921.—The present report is based largely on explorations made by the author during the summer of 1919 in the Rhön Mountains of Germany. The bogs of the region show few peculiar species, but the presence of *Sphagnum fuscum*, *S. Wilsoni*, and *S. tenellum* is emphasized and attention is called to the absence of certain species, especially members of the *Subsecunda* group. In all, 28 species of *Sphagnum* are enumerated, many of which are represented by several varieties and forms. Definite localities are noted in each case.—*A. W. Evans*.

266. TAYLOR, WM. RANDOLPH. *Additions to the flora of Mount Desert, Maine*. Rhodora 23: 65-68. 1921.—A list is given of species collected by Macfarlane and the author in 1915 and by the latter in 1920. The list includes algae, bryophytes, and angiosperms. In some cases the localities are given and in others only the data as to abundance.—*James P. Poole*.

267. TÖLG, F. *Eine naturwissenschaftliche Studienreise in das Amanus-Gebirge (Alman Dag)*. [A scientific expedition in the Amanus mountain range.] Arch. Naturgesch. Abt. A. 85: 88-130. Fig. 1-11. 1919 [1920].—Observations, made on a journey during the spring and summer of 1914 in eastern Asia Minor, are recounted. These deal in large part with the flora, native and cultivated. The notes of the author, since deceased (April 8, 1917), have been edited with a foreword by JOSEF FAHRINGER. A bibliography of 28 titles is appended.—*C. E. Allen*.

268. UGOLINI, U. *Contributo alla flora del Tirole Cisalpina*. [Contribution to the knowledge of the flora of cisalpine Tyrol.] Nuova Gior. Bot. Ital. 27: 251-261. 1920.

269. VIGNOLE-LUTANI, F. *Contributo alla flora del circondarie di Alba*. [Contribution to the knowledge of the flora about Alba.] Nuova Gior. Bot. Ital. 27: 208-322. 1920.—A list is given of names and stations of the plants collected and the significance noted of the occurrence of some of these in the study of plant distribution.—*Ernst Arschwager*.

270. WARD, F. KINGDOM. *The distribution of floras in S. E. Asia as affected by the Burma-Yunnan Ranges*. Jour. Indian Bot. 2: 20-26. 1 map, 2 pl. 1921.—The Burma-Yunnan Ranges are a southerly-extending arc of mountains at the eastern end of the Himalayas and the western end of the West China mountains, forming the divide between the Salween and the Brahmaputra and Irrawaddy Rivers. This paper refers especially to the flora of the

southern end of the Ranges (26° N. lat., 98° 30' E. long.). The entire region is forested, and may be divided into: (1) Jungle, up to 5,000 feet, composed almost entirely of Indo-Malayan forms (*Dipterocarpus*, *Shorea*, *Hiptage*, *Elaeocarpus*, *Engelhardtia*, *Garcinia*, *Caryota*, *Calamus*, and *Ficus*, with many epiphytes, lianas, and tree ferns. (2) Temperate rain forest, 5,000–8,000 feet containing many large trees (*Schima*, *Gordonia*, *Bucklandia*, *Quercus*, *Magnolia*, *Acer*, and *Rhododendron*, an abundance of epiphytes, small herbs, and moss, few lianas, and a moderate undergrowth, mainly bamboo. (3) Conifer forest, 8,000–12,000 feet, with *Abies*, *Rhododendron emuldrum*, and bamboos dominant; a few other conifers appear locally; there are many shrubs and few lianas. Alpine meadows are occasionally met with at 9,000–11,000 feet. (4) An alpine belt.—These Ranges are specially rich in Ericaceæ, there being more than 50 species of *Rhododendron* alone.—The flora is a mixture of Indo-Malayan, Himalayan, Chinese, and endemics. The Indo-Malayan element preponderates at lower altitudes and up the river valleys, but fades out eastward in Yunnan. In modified form it extends eastward in a belt along the coast of China almost to the Yangtze. The Himalayan element is well represented at intermediate levels, less so at high levels. The Chinese elements are derived from 2 distinct sources: (1) from the higher ranges of western China, and confined to higher altitudes; and (2) from a curious "Burma-Yunnan" flora, rich in endemics, and restricted to the area lying between the Salween River valley, about 26° N. lat., and the eastern end of the Himalayas.—The author concludes that "the N. E. Frontier belt, and more especially the Mekong-Salween divide, is primarily a barrier, botanical and zoological, marking the eastern limit of the Indo-Malayan, or Oriental region, for at least 750 miles. Secondarily it is, or has been, connected in the north with the Himalayan ranges on the one hand, and with the great China divide on the other, serving both to keep them apart and to link them up to a common centre."—*Winfield Dudgeon*.

271. WILSON, E. H. Notes from Australasia. I. Jour. Arnold Arboretum 2: 160–163. 1921.—The author speaks of his first impression of the peculiar character of the Australian flora, describes the forest vegetation of Western Australia, and mentions the most important forest trees, chiefly *Eucalyptus*.—*Alfred Rehder*.

APPLIED ECOLOGY

272. ANONYMOUS. A serious mis-statement. Amer. Bee Jour. 61: 64. 1921.—An erroneous report, that grapes are valuable as a source of honey, is refuted.—*J. H. Lovell*.

273. ANONYMOUS. Honey from city shade trees. Amer. Bee Jour. 61: 149–150. 1921.—In the city of Washington there are 10,000 basswood trees within a radius of 2 miles from Iowa Circle. A beekeeper, who moves his bees into the city, gets an average of about 35 pounds per colony of basswood honey. The moving of bees to the city is a novel idea.—*J. H. Lovell*.

274. ANONYMOUS. The beekeeping industry of Florida. Beekeepers' Item 5: 13–14. 1921.—With better beekeeping methods and the eradication of bee diseases the outlook for beekeeping in Florida is very promising. Probably nowhere in the U. S. A. is there so large a number of colonies of bees within so small an area as in the tupelo swamps along the Apalachicola River. The north central portion of the state contains extensive areas of gallberry (*Ilex glabra*). In the central and southern parts orange and grapefruit groves present possibilities to the progressive beekeeper. In other sections black mangrove, coconut, saw and cabbage palmettos, and partridge pea are valuable honey plants.—*J. H. Lovell*.

275. ANONYMOUS. The Spanish needles as a honey producer. Amer. Bee Jour. 61: 90. 1921.—Honey from *Bidens aristosa* is reported by nearly every county in Kansas.—*J. H. Lovell*.

276. ANONYMOUS. Wild thyme in New York. Amer. Bee Jour. 61: 53. 1921.—*Thymus serpyllum* has established itself over several square miles at Prattsville, New York. The honey is light amber in color, with a good body and a very good flavor. During 25 years the honey flow has never entirely failed.—*J. H. Lovell*.

277. ALLEN, GRACE. **Beekeeping as a sideline.** Gleanings in Bee Culture 49: 94-95. 1921.—This is a popular description of insect- and wind-pollinated flowers.—J. H. Lovell.

278. ALLEN, GRACE. **Beekeeping as a sideline.** Gleanings in Bee Culture 49: 157-158. 1921.—This popular review of the main nectar-yielding plants of the U. S. A. gives distribution and time of blooming.—J. H. Lovell.

279. BALDENSPERGER, PH. J. **Lavender.** Amer. Bee Jour. 61: 147-148. 1921.—Three species of lavender grow in the Alps. *Lavendula Stoechas*, common in the lowlands and hills species up to 330 feet, grows 20 inches tall and blooms March-May. *L. latifolia* grows at a higher altitude (600-1,320 feet) on calcareous soil, and blooms June-July. Neither of these species yield as much honey as *L. officinalis*, which grows at an altitude of 1,300 feet. The arid mountains are covered with bushes, which furnish a most delicious honey of a yellowish color, and which peasants sell by the hundred kgm. to perfume manufacturers.—J. H. Lovell.

280. BALDWIN, F. M. **A successful experiment with package bees.** Domestic Beekeeper 36: 10-11. 1921.—At Mt. Vernon, Georgia, the long honey flow from maples is very valuable. It begins early and continues until fruit bloom, or from Jan. 3 to Feb. 20. The temperature in this locality rarely drops below freezing.—J. H. Lovell.

281. BALDWIN, F. M. **Granulated honey.** Domestic Beekeeper 35: 15-16. 1921.—These notes on the honey plants of Georgia include mention of velvet bean, which is extensively planted for forage and secretes nectar well in the fall.—J. H. Lovell.

282. BALDWIN, F. M. **The color and flavor of gallberry honey.** Dixie Beekeeper 3: 12-15. 1921.—Pure gallberry (*Ilex glabra*) honey is difficult to get in Georgia. It is yellow in color and has the flavor of magnolia bloom. It has been erroneously reported to resemble white clover honey.—J. H. Lovell.

283. BALDWIN, E. G. **The honey plant regions of Indiana.** Amer. Bee Jour. 61: 51-53. 2 fig. 1921.—The author presents a description and map of the honey-plant regions of Indiana. Eight regions are recognized: (1) The limestone soils in the northern part of the state are covered with a heavy layer of clay, gravel, and sand, the clovers being less reliable than 100 miles south of the Michigan line. (2) The best clover belt is along the Wabash River extending from Cass to Adams and Wells counties; basswood is also abundant in this section. (3) A fairly good clover region extends from the Ohio line to Fountain County on the west border; Indianapolis is near the center of this area. (4) The best sweet clover region occupies the eastern portion of the state. (5) Locust (*Robinia pseudacacia*) is an important source of surplus in southeastern Indiana. (6) In the extreme southwestern portion climbing milkweed (*Gonolobus laevis*) yields large crops of honey. (7) From Knox County northward to Vermilion County along the west border smartweed may be considered as the main source of surplus. (8) In the Kankakee Valley marshland Spanish needles (*Bidens aristosa*) is the principal honey plant.—J. H. Lovell.

284. BENDER, C. F. **Red clover as a honey plant.** Amer. Bee Jour. 61: 99. 1921.—During protracted hot weather honeybees in large numbers gathered nectar from mammoth red clover. The flow lasted for 2 weeks, and 7,000 pounds of comb honey were secured. The quality was excellent but the color was a little darker than that of white clover and the flavor a little stronger.—J. H. Lovell.

285. BURKHOLDER, WALTER H. **The effect of two soil temperatures on the yield and water relations of healthy and diseased bean plants.** Ecology 1: 113-123. 1920.—The 2 soil temperatures used were 18 and 26°C., the results showing many irregular variations. In general diseased bean plants (*Fusarium Martii Phaseoli*) transpired about 50 per cent as much as healthy plants, and a similar reduction in yield of seed occurred. If transpiration and yield

are taken as criteria, the soil temperatures appear to have very little effect on the severity of Fusarium root rot of beans. But low soil temperature decreases the yield of healthy plants considerably.—*Charles A. Shull.*

286. BURNS, W., and G. M. CHAKRADEV. An ecological study of Deccan grassland. Jour. Indian Bot. 2: 84-91. 1 pl. 1921.—Seven acres of severely overgrazed "worst Deccan grazing land" near Poona, western India have been leased as an experimental plot for studying the problem of improvement of pasture land ruined by excessive grazing. After fencing the area, parts were cultivated and sown with various wild grasses; other parts were left to regenerate spontaneously. Six-m. square permanent quadrats have been laid out in different consociations in the area and studied in detail. For purposes of comparison, 2 other permanent quadrats have been laid out in the adjacent unprotected area. It is expected that protection, either alone or combined with a minimum of treatment, will enable valuable wild forage grasses to become established, after which intelligent exploitation will be necessary to maintain the pastures in a productive state.—*Winfield Dudgeon.*

287. CANNELL. The honey plants of France. Amer. Bee Jour. 61: 236. 1921.—The honey flora of France includes lavender (3 species), thyme, sage, mountain pennyroyal (*Satureja montana*), heather, borage, thistles, and *Mula viscosa*. Cultivated honey plants are locust, orange, alfalfa, sanfoin, clovers, and fruit bloom. From 25 to 75 pounds of a fragrant golden honey is secured from *Lavandula spica* (probably *L. vera*). Rosemary (*Rosmarinus officinalis*) is a slow but sure yielder of a very choice honey; the famous Narbonne honey is partly gathered from rosemary. If lavender and rosemary grew well in America they would be valuable additions to the honey flora.—*J. H. Lovell.*

288. CARLING, A. *Phacelia tanacetifolia*. Western Honey Bee 9: 6-7. 1921.—Fiddle-neck was formerly abundant on the cattle ranges of southern California, but thousands of acres have been destroyed by grazing. In Sweden on 500 square m. of land 1 kgm. of *Phacelia* seed was broadcasted and harrowed in. By the middle of August the plants had reached maturity and were $\frac{1}{2}$ m. high. The plants began blooming 8 weeks after planting and continued for 4 weeks. Honeybees gathered the nectar from 3 a.m. to 9:30 p.m.; 50-60 kgm. of honey were secured. The honey was pale yellow, clear, and thin, and had an excellent flavor.—*J. H. Lovell.*

289. CLAUSTRE, R. *Apiarian flora. Malope*. Gazette Apicole 22: 41. 1921.—*Malope* is an annual species of mallow which secretes nectar freely and blooms from May to July and again from October to November. The flowers are about the size of those of creeping mallow but have brighter colors. The large rugose leaves wilt and fall when blooming begins. The pollen is ash-gray colored. As soon as *Phacelia* begins to bloom the flowers are much less frequently visited by bees. *Malope* sowed at Ax (Ariege, France) reduced the diameter of its flowers and almost doubled the surface of its leaves.—*C. P. Dadant.*

290. COLEMAN, GEO. A. Beekeeping in our California national forests I. Honey flora. Western Honey Bee 9: 51-54. 1921.—The list includes all native herbaceous plants, shrubs, and trees valuable for pollen and nectar, also introduced species which have escaped from cultivation and are likely to prove good honey plants. Longleaf willow (*Salix longifolia*) yields a dark honey and much pollen and blooms from January to March. This species ranges from the Arctic Circle to Lower California and ascends the Sierra foothills to an altitude of 4,000 feet. White willow (*S. lasiolepis*) yields an amber-colored honey with a pleasant flavor, also much pollen. It blooms from February to March and ranges from northern to Lower California, and is valuable for early brood-rearing. Nuttall's willow (*S. flavescens*) is the earliest blooming mountain honey plant. It grows in the northern Coast Ranges, the Sierra Nevada, and San Bernardino Mountains. Silky willow. Velvet willow (*S. sitchensis*) is also valuable for nectar and pollen. The cottonwoods and poplars (*Populus Fremontii*, *P. trichocarpa*, *P. tremuloides*) furnish a large amount of pollen. California wax myrtle (*Myrica californica*) and sweet bay (*M. Hartwegii*) are wind-pollinated shrubs visited by bees for pollen. Mountain birch (*Betula fontinalis*) yields early pollen.—*J. H. Lovell.*

291. COLEMAN, GEO. A. **Beekeeping in our California national forests II. Honey flora.** Western Honey Bee 9: 84-86. 1921.—California hazelnut (*Corylus rostrata*), white alder (*Alnus rhombifolia*), red alder (*A. rubra*), mountain alder (*A. tenuifolia*), wind-pollinated shrubs, furnish early pollen. Scrub oak (*Quercus dumosa*), blue oak or mountain oak (*Q. Douglasii*), and tanbark oak (*Q. densiflora*) are wind-pollinated trees from which bees gather much pollen. Scrub oak is abundant in the chaparral. From blue oak in Monterey County sufficient honeydew is gathered in September and October to winter bees. Honeydew is also found on coast live oak. Tanbark oak blooms in warm locations in June, but usually the flowers open from the latter part of August to October. Giant chinquapin (*Castanopsis chrysophylla*) and golden chinquapin—variety *minor* of the preceding species—yield during late summer and in the fall a light amber-colored honey of good quality.—J. H. Lovell.

292. COLEMAN, GEO. A. **Beekeeping in our California national forest III. Honey flora.** Western Honey Bee 9: 116-117. 1921.—Bush chinquapin (*Castanopsis sempervirens*) is important in the fall for pollen. Wild buckwheat (*Eriogonum fasciculatum*) is abundant on the mesas and mountain slopes of southern California. It ranks 3rd as a honey producer in its range, white and black sages ranking it. It blooms from April to November. The honey is light to dark amber and of good quality. There are a dozen other nectar-yielding species at various elevations from the sea coast to the summits of the Coast Range. Mountain knotweed (*Polygonum Bolanderi*) blooms from July to September and yields an amber-colored honey. Dotted smartweed (*P. acre*) blooms from June to the middle of September, yielding abundant but poor quality honey. Ice plant (Sea fig, *Mesembryanthemum equilaterale*), grows on dunes and cliffs from Marin County to San Diego County. The flowers open at mid-day throughout the summer. The honey is white and has a good flavor. Two species of *Clematis* and the common buttercup are valuable chiefly for pollen.—J. H. Lovell.

293. COLEMAN, GEO. A. **Beekeeping in our California national forests No. II. Honey flora. IV.** Western Honey Bee 9: 149-151. 1921.—California barberry (*Berberis pinnata*), rather common on the hills from San Francisco to Monterey, blooms in March and April. The honey is amber-colored and has a good flavor. California laurel, bay-tree, or Oregon myrtle (*Umbellularia californica*), is found in the cañons of the Coast Ranges from southern Oregon to San Diego; it blooms from December to March. The honey is dark amber, and is valuable for early brood-rearing. Cream cups (*Platystemon californicus*) is common throughout a large part of California, blooming from April to May and valuable for pollen. Matilija poppy (*Romneya Coulteri*), valuable for pollen, is found from Santa Maria River to San Diego County. California poppy (*Eschscholtzia californica*) yields abundant pollen. Western poppy (*Papaver californicus*) grows in the southern part of the state and is valuable for pollen. Two early blooming honey plants are the flowering currant (*Ribes sanguineum*) and common gooseberry (*Ribes Menziesii*). Chamise (*Adenostoma fasciculatum*) is the most abundant and characteristic shrub of the higher Coast Ranges and the Sierra Nevada. It frequently forms extensive thickets to the exclusion of all other vegetation. These thickets, known as "chemisals" or chamise brush, cover wide areas with a low dense growth of a uniform blue green color. Chamise yields a light amber honey of good quality. The wild raspberry (*Rubus leucodermis*) and the common blackberry (*Rubus vitifolius*) secrete much nectar and in good seasons yield a surplus of honey. Mountain mahogany (*Cercocarpus parvifolius*), a common chaparral shrub in the mountains, is valuable for nectar.—J. H. Lovell.

294. COLEMAN, GEO. A. **Beekeeping in our California national forests No. II. Honey flora. V.** Western Honey Bee 9: 182-184. 1921.—Oregon crab apple (*Malus rivularis*) blooms from May to June and yields a white delicious honey. Black haw (*Crataegus Douglasii*) in April and May is the source of a white honey. Christmas berry (*Heteromeles arbutifolia*) yields in July a reddish honey of good quality and pleasant flavor. Several species of cherries and plums yield a light colored honey of good flavor.—J. H. Lovell.

295. COMBES, R. [Rev. of: ANNET, E. Contribution à l'étude du palmier à huile. Le palmier à huile au Cameroun, variétés, culture, exploitation. (Contribution to the study of the oil-palm. The oil-palm of Kamerun, varieties, culture, and uses.) Thèse de Doctorat, Larose, éditeur, 11, rue Victor-Cousin, Paris.] Rev. Gén. Bot. 33: 398. 1921.

296. CRANE, J. E. Wild thyme in New York. Amer. Bee Jour. 61: 179-180. 1921.—Wild marjoram (*Origanum vulgare*) is an important honey plant in southwestern Vermont. It has been incorrectly called wild thyme. The question is raised whether the plant in New York described as wild thyme is not wild marjoram.—J. H. Lovell.

297. DADANT, C. P. Those honey plants from China. Amer. Bee Jour. 61: 22. 1921.—Rape (*Brassica Rapa*) in China yields an immense amount of nectar. The honeyflow lasts from the middle of April to the first of May. It is a profitable crop in Australia, where it is valuable for both pollen and nectar.—J. H. Lovell.

298. ENSIGN, G. L. Star thistle. Amer. Bee Jour. 61: 89. 1921.—*Centaurea solstitialis* is an important source of honey in the Sacramento and San Joaquin Valleys, California. It blooms from June 10 until heavy frosts.—J. H. Lovell.

299. FOX, ELIAS. Trees for honey. Amer. Bee Jour. 61: 64. 1921.—The box elder (*Acer Negundo*) is not only an excellent shade tree, but is also valuable for both nectar and pollen.—J. H. Lovell.

300. HABER, VERNON R. The honey producing possibilities in North Carolina. Amer. Bee Jour. 61: 217-218. 1921.—The flora of North Carolina is intermediate between those of the northern and southern states. The great variation in climate and altitude makes possible a large number of species. The state is divided into 3 well-defined regions: The Coastal Plain, the Piedmont Plateau, and the mountainous region.—The Coastal Plain is a vast area of lowland, the eastern half of which is not more than 20 feet above sea level. Swamps and lakes abound, and the coast-line is deeply indented by broad tidewater rivers, bays, and sounds. The normal average precipitation is 54 inches. The most important honey plants are the tupelos (*Nyssa biflora* and *N. aquatica*), gallberry (*Ilex opaca*), tulip-tree (*Liriodendron tulipifera*), rattan-vine (*Berchemia scandens*), and huckleberry. The tupelos and rattan-vine occur on thousands of acres of swampland; gallberry, holly, and huckleberry grow upon higher soils. This section offers the best opportunity for apiculture. Many apiaries range from 100 to 125 colonies of bees, and report an average surplus per colony of 45-50 pounds. The honey flow comes very early in the spring.—The mountainous area covers about 6,000 square miles. The summers are cooler and the winters are more severe than in the eastern part of the state. A magnificent forest of hardwood trees reaches its highest development in this region. Sourwood (*Oxydendrum arboreum*), most abundant on the eastern slopes of the Blue Ridge Mountains, is the most important source of honey. Basswood is common on the northern slopes of the larger mountains. Other valuable honey plants are tulip-tree, locust, maple, sumac, wild cherry, goldenrod, and aster. The honey-flow from the tulip-tree begins about May 15, and from basswood and sourwood the latter part of June. Most of the surplus honey comes from forest trees.—The intermediate region is occupied by the Piedmont Plateau; it is the agricultural section of the state. Sourwood is most abundant in the upper portion nearest the mountains. Among the more important honey plants are tulip-tree, clovers, persimmon, holly, sumac, fruit-trees, cow-peas, maple, blackberry, goldenrod, and aster. Aster yields a prolonged flow of nectar in autumn, and 25-30 pounds of surplus honey often being secured. The apiaries are rather small and many of the honey plants are not reliable every year though there is seldom a complete failure.—J. H. Lovell.

301. HADSELL, B. A. Nectar from alfalfa. Gleanings in Bee Culture 49: 363. 1921.—Many farmers ruin both the seed and honey crop of alfalfa by over-irrigation.—J. H. Lovell.

302. HASSLBAUER, A. M. **The honey crop conditions.** Beekeepers' Item 5: 15, 44, 76, 108. 1921.—Brief notes are given on the condition of Texan honey plants.—*J. H. Lovell.*

303. HASSLBAUER, A. M. **The honey crop conditions.** Beekeepers' Item 5: 140. 1921.—Pin wheel or marigold (*Gaillardia pulchella*), a well known honey plant in Texas, is confined chiefly to the black land and the adjoining limestone hills; it is rarely found on sandy or white clay soils. During the spring of 1921 in the vicinity of San Antonio, Texas, horsemint failed to yield much nectar, and the bees were dependent on marigold.—*J. H. Lovell.*

304. HOWARD, A., G. L. C. HOWARD, and A. R. KHAN. **Studies in the pollination of Indian crops.** Mem. Dept. Agric. India Bot. Ser. 10: 195-218. Pl. 5. 1919.—Methods of pollination of the following plants are given: San-hemp (*Crotalaria juncea* L.), pigeon pea (*Cajanus indicus* Spreng.), Java indigo (*Indigofera arrecta* Hochst.), Sumatran indigo (*I. sumatrana* Gaertn.), flax (*Linum usitatissimum* L.), Taramira or duan (*Eruca sativa* Lam.), Til (*Sesamum indicum* L.), Niger (*Guizotia abyssinica* Cass.), round podded jute (*Corchorus capsularis* L.), long podded jute (*C. olitorius* L.), Roselle (*Hibiscus Sabdariffa* L.).—*J. J. Skinner.*

305. KNABENSHUE, S. S. **Southern California honey prospects.** Western Honey Bee 9: 139. 1921.—In the spring of 1921 weather conditions in southern California were unfavorable to nectar secretion by orange bloom, and only a small surplus of honey was secured. Late rains ensure 50 per cent of a full crop of honey from the sages.—*J. H. Lovell.*

306. LIVINGSTON, T. W. **How far do bees fly for nectar.** Dixie Beekeeper 3: 17. 1921.—Bees do not usually fly more than 1 mile from the hive in gathering nectar, but occasionally store a surplus from flowers 3-4 miles distant. Italian bees on an island in Puget Sound gathered nectar from goldenrod on the mainland 5 miles away.—*J. H. Lovell.*

307. LOVELL, JOHN H. **A plant honeydew from the Douglas fir.** Amer. Bee Jour. 61: 93. 1921.—The author summarizes the observations of Davidson and Teit on the exudation of a sweet liquid by the tips of the leaves of *Pseudotsuga Douglasii*. A beekeeper at Victoria, British Columbia, reports 2-3 supers of sections are gathered in some seasons from this source. The honey is fair in quality, pale amber-colored, with rather dark cappings; it crystallizes early. It is a poor winter food.—*J. H. Lovell.*

308. LUSHER, A. E. **Fogs affect nectar secretion in sage.** Gleanings in Bee Culture 49: 362. 1921.—Sage yields nectar better in the fog belt than in the region beyond it.—*J. H. Lovell.*

309. MILLEN, F. ERIC. **Sweet clover as a honey plant.** Canadian Hort. and Beekeeper 29: 3-4. 1921.—The value of sweet clover (*Melilotus*) as a honey plant varies greatly with the locality. In the U. S. A. it has long been recognized as a valuable source of surplus. In Canada its value has not yet been determined. Possibly in Ontario the acreage of sweet clover in any one district is too small to yield large honey crops. Soil and weather conditions are also important factors affecting nectar secretion, examples being cited in alsike (*Trifolium hybridum*) and white or Dutch clover (*T. repens*). The following yields for sweet clover obtainable in Ontario are given; in 1 apiary a colony stored 23 pounds in 1 day; in another, 500 pounds were stored in 5 weeks. Thirty-two weak colonies gave 4,500 pounds surplus; and 88 packages gave 6,000 pounds surplus and increased to 99 colonies. In Ontario sweet clover honey is light in color and mild in flavor.—*F. W. L. Sladen.*

310. MORRIS, T. B. **Observations on horsemint.** Beekeepers' Item 5: 133. 1921.—The secretion of nectar by *Monarda punctata* is greatly affected by weather conditions.—*J. H. Lovell.*

311. OSTERHOUSE, G. W. **Rape.** Amer. Bee Jour. 61: 236-237. 1921.—Large fields of rape (*Brassica Napus*) are grown in the Netherlands. Beekeepers pay a good rent for locations near fields of blooming rape.—J. H. Lovell.

312. PARKS, H. B. **Effect of soils on honey flows.** Beekeepers' Item 5: 39-40. 1921.—Two centuries ago Della Torre noticed that bees visit plant species growing in one kind of soil, but do not visit the same species growing in another kind of soil. Sourwood (*Oxydendrum arboreum*) thrives on acid soils but not on limestone soils; buckthorn (*Rhamnus*) on the contrary is found on limestone soils. In New York white clover yields more nectar on limestone soils than on acid soils. In Texas the distribution of almost every plant is determined by the rock formation.—J. H. Lovell.

313. PELLETT, FRANK C. **Correct name for wild thyme.** Amer. Bee Jour. 61: 180. Fig. 1-4. 1921.—Wild thyme (*Thymus serpyllum*) and wild marjoram (*Origanum vulgare*) are often confused. Both are naturalized from Europe and both occur in New England and New York. A brief description is given of each species.—J. H. Lovell.

314. PELLETT, FRANK C. **Garden plants which attract the bees.** Amer. Bee Jour. 61: 175. 1921.—Many garden flowers,—bee balm, bachelor's button, marjoram, horehound, lavender, and mignonette,—are valuable sources of nectar. Among the vegetables, onions, celery, parsnips, and cabbage are good honey plants.—J. H. Lovell.

315. PELLETT, FRANK C. **The orange as a source of nectar.** Amer. Bee Jour. 61: 138. 1921.—The quality of orange honey is so high that it often commands a premium in the market. The groves of Satsuma oranges along the coast of Mississippi are not regarded as of much importance; likewise in Florida the orange yields nectar much less freely than in California. At Visalia, California, the flow is so heavy that the clothing of men engaged in cultivating the groves is saturated with nectar. A Tulare County beekeeper extracted 171 pounds of orange honey in 10 days. Near large orange orchards apiaries contain as many as 400 colonies. Along the coast the fogs are unfavorable and the flow is much lighter than in the interior.—J. H. Lovell.

316. REDWAY, JACQUES W. **An overlook of the relations of dust to humanity.** Ecology 1: 190-192. 1920.—The floating and wind-borne dust of the atmosphere is briefly discussed. The ecological relations of dust to disease-producing bacteria, especially in cities, are touched upon.—Charles A. Shull.

317. ROOT, E. R. **The call of the Southland.** Gleanings in Bee Culture 49: 206-209. 1921.—In the Coastal Plain of Virginia, North Carolina, South Carolina, Georgia, and Alabama the soils along the rivers and bays and in the swamps are acid and unfavorable to clovers. The most important honey plants are titi, gallberry, blackberry, huckleberry, and the tupelos, which flourish in acid soil. The best honey comes from gallberry (*Ilex glabra*) and is very similar in color, flavor, and body to that of white clover. Its quality is often impaired by the presence of titi honey. The tupelos are the source of an excellent white honey which never granulates. There are wonderful opportunities for beekeeping in this section, but the conditions are very different from those in northern states.—J. H. Lovell.

318. SANDERS, H. W. **Seasonable notes.** Domestic Beekeeper 35: 8. 1921.—The 1st honey flow of importance in the North [U. S. A.] comes in May from the dandelion. The honey is thick, yellow, and strong-flavored, with the odor of the dandelion. It is very valuable for stimulating brood-rearing.—J. H. Lovell.

319. SCHRELS, W. B. **Beekeeping in foreign lands.** Interesting facts about apiculture in little Costa Rica. Gleanings in Bee Culture 49: 146-148. 1921.—A list of the most important honey plants in Costa Rica includes citrus fruits, mesquite, almond, catsclaw, many vines, and tropical fruits. The honey flow begins with the dry season, which lasts 6 months; with the 1st rain, in April, the flow decreases.—J. H. Lovell.

320. SCULLEN, H. A. **Beekeeping in the State of Washington.** Amer. Bee Jour. 61: 96-97. 1921.—From the standpoint of bee culture the state may be divided into 5 distinct regions: (1) Yakima, Columbia, and Okanogan Valleys, and the district about Walla Walla, where the main honey plants are alfalfa and sweet clover; (2) arid region east of the Cascades, not yet under irrigation; (3) extreme northeastern part of the state where the annual rainfall is over 20 inches. The surplus comes from fireweed (*Epilobium angustifolium*), white clover, snow-berry (*Symphoricarpos*), dandelion, and alfalfa; (4) the east and southeast counties, where wheat-growing is the leading industry. White clover is the most important honey plant; (5) the largest region is that portion of the state west of the Cascade Mountains, where the annual rainfall varies from 20 to 200 inches. Fireweed is the leading honey plant, but white and alsike clovers, Oregon maple, vine maple, Cascara sagrada, huckleberry, and many others are important locally.—J. H. Lovell.

321. SHORTLIDGE, CHAS. B. **Coreopsis as a source of honey.** Amer. Bee Jour. 61: 66. 1921.—Along the Delaware River *Bidens trichosperma* and *B. laevis* are reliable honey plants. An average per colony of 20 pounds of extracted honey has been secured, with 20 pounds left in the hives for winter stores. The honey is light yellow and has a faint spicy odor and flavor. The plants are often called Coreopsis.—J. H. Lovell.

322. SLADEN, F. W. L. **Beekeeping in the North.** Canadian Hort. and Beekeeper 29: 4. 1921.—Conditions 200-300 miles north of the international boundary are described. Willows, blueberry (*Vaccinium canadense*), bluebell (*Mertensia paniculata*), wild strawberry, and Labrador tea (*Ledum groenlandicum*) are among the principal plants which build up the colonies in spring. Alsike, white clover, and fireweed (*Epilobium angustifolium*) are the principal sources of surplus honey. The spreading of alsike and white clover in the cleared districts of the clay belt in northern Ontario and northern Quebec augurs well for the future of beekeeping there. A fairly good honey crop is obtained from white clover around Dauphin, Manitoba, and Edmonton, Alberta, where it is moderately plentiful. The honey flow from clover, begins 2-3 weeks later in the north than in the south but lasts 4-5 weeks longer. Fireweed, which grows abundantly after forest fires, is scattered across the continent and is spreading as the land is cleared. For 4 consecutive years a good honey crop has been obtained at Melfort, northern Saskatchewan, mainly from fireweed. Fireweed honey flow is usually terminated abruptly about the end of August or the beginning of September by light frosts. Minor honey plants are asters, especially *Aster macrophyllus* (Ontario), goldenrod, (Quebec to Saskatchewan), anise (*Agastache foeniculum*), hyssop (Manitoba, Saskatchewan, and Alberta), and wild raspberry (Haileybury, Ontario). Aster honey when unripe has caused winter loss in northern Ontario. The north is particularly well adapted for beekeeping, as the warm days and cool nights favor nectar secretion, and the long working days increase the honey crop. In favorable seasons 200 pounds of clover honey per colony is common near Lake Temiskaming. At Roberval on Lake St. John, Quebec, an average annual colony-yield of over 200 pounds is obtained from alsike and white clover. July and August are the best honey-producing months.—F. W. L. Sladen.

323. SLADEN, F. W. L. **Fireweed or willow-herb; a great honey plant of the far North extending into this country in a few places only.** Gleanings in Bee Culture 49: 212-214. 2 fig. 1921.—*Epilobium angustifolium*, a native of northern North America and Eurasia, has a more northern range than any other important honey plant. In Canada it is most abundant in British Columbia, but it extends eastward to the Atlantic maritime provinces. It springs up abundantly on newly burned over forest land, but usually dies out after a few years. At Hector, British Columbia, it is found at an altitude of 5,200 feet. In a good fireweed locality a surplus of 500 pounds per colony has been obtained. At Montcerf, Quebec, the average annual yield per colony in a large apiary was about 100 pounds. In the Gatineau Valley the honey flow lasts from about July 10 to September 5. Fireweed is propagated both by seed and by rootstocks. Solitary stalks of a white-flowered variety were observed in a stand of fireweed at Monteith, Ontario. The honey is almost water white, has a mild flavor, and granu-

lates after extraction.—High up in the mountains of British Columbia there is another species, *E. latifolium*, which has broader leaves and larger flowers, but is less than 1 foot tall.—*J. H. Lovell*.

324. SMALL, A. V. Sources of Kansas honey. *Amer. Bee Jour.* 61: 62-63. 1921.—Alfalfa and sweet clover are the principal honey plants. The secretion of nectar by alfalfa is affected by altitude.—*J. H. Lovell*.

325. TOCHUDIN, ERNST. Nectar secretion affected by altitude. *Gleanings in Bee Culture* 49: 100. 1921.—The intense radiation at high altitude stimulates the secretion of nectar. The average honey production per colony, according to statistics prepared by the French Departement des Pyrenées, is as follows: from sea level to 1,000 feet, 6 pounds, 10 ounces; from 1,000 to 2,000 feet, 8 pounds, 3 ounces; from 3,000 to 4,000 feet, 15 pounds, 7 ounces; from 4,000 to 5,000 feet, 19 pounds, 13 ounces.—*J. H. Lovell*.

326. VOHIES, CHAS. Mexican palo-verde. *Gleanings in Bee Culture* 49: 162. 1921.—Mexican palo-verde or "bogota" (*Parkinsonia aculeata*) is abundant on the university campus, Tucson, Arizona. It is a native of Mexico and extends into Arizona in the extreme southwest for a short distance only. A part of the first crop of honey comes from this source. The quality of the honey is good.—*J. H. Lovell*.

327. WEST, G. F. Beekeeping in sunny Alberta. *Western Gardener and Poultry Jour.* 2: 77-78. 1921.—Beekeeping conditions at Medicine Hat, Alberta, Canada, are discussed. Irrigation projects are being installed and some are in operation. Alfalfa (*Medicago sativa*) when grown on irrigated land in this vicinity will yield an enormous crop of honey. Wolfberry (*Symphoricarpos occidentalis*) also contributes a part of the crop, and there is at times a twang of bergamot honey (*Monarda mollis*). Gumweed (*Grindelia squarrosa*) grows in large patches, but no bees were seen working on it, and the honey does not have the objectionable flavor attributable to this plant.—*F. W. L. Sladen*.

328. WILDER, J. J. Flora for comb honey. *Dixie Beekeeper* 2: 12-14. 1921.—Among the best regions for the production of comb honey in the Southeast are the Black Belt of Mississippi, central Florida, southeast Georgia, and along the Apalachicola River in northwestern Florida.—*J. H. Lovell*.

329. WILDER, J. J. Pepperbush. *Dixie Beekeeper* 2: 15-16. 1921.—*Clethra alnifolia* yields a light amber-colored honey with good flavor and body. In southeast Georgia this shrub makes beekeeping around the great swamps possible. It furnishes all of the winter stores and maintains brood-rearing during a period when it would otherwise cease. A surplus is obtained in some localities. It begins blooming July 1 and continues until late fall, but the flow is never very heavy.—*J. H. Lovell*.

330. WILDER, J. J. Sourwood as a honey plant. *Dixie Beekeeper* 2: 10-12. 1 fig. 1921. *Oxydendrum arboreum* is the most important honey plant of the Blue Ridge section of the southeastern states. It not only grows on the mountain sides and on the hills of the Piedmont Plateau but also along streams of the Coastal Plain. In the lowlands the bees gather no nectar from it. While it is common on the mountains it never forms a dense growth. It does not yield well every year, and in some seasons no surplus is obtained. The best crop ever secured was an average of about 100 pounds per colony. The honey is almost water white, with heavy body and mild delicious flavor.—*J. H. Lovell*.

331. WILDER, J. J. Summer farewell. *Dixie Beekeeper* 3: 3-4. 1921.—Aster is very abundant on the sandy soils of northern and central Florida. The honey is almost water white and has an excellent flavor and good body. It granulates at the beginning of cold weather. A surplus of 30-50 pounds per colony is often obtained, but 150 pounds have been removed from a single colony.—*J. H. Lovell*.

332. WUST. *Bienennährpflanzen mit schneller Vermehrungsfähigkeit für Imkergärten.* [Honey plants, which grow and spread rapidly, for the beekeeper's garden.] *Bienenflege* 43: 42. 1921.—Garden plants of special value for honey are noted and described.—*M. G. Dadant.*

333. ZEISS. *Der Götterbaum.* [Tree of Heaven.] *Bienenflege* 43: 60. 1921.—The value of *Ailanthus glandulosa* for shade and honey is discussed. It blooms in central Europe from June 5 to 25, and is a good honey producer.—*M. G. Dadant.*

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 111, 132, 157, 210, 245, 270, 271, 508, 515, 787, 815, 906, 921, 923)

334. ANONYMOUS. *Conférences congrés de 1921 de la Société Forestière de Franche-Comté et Belfort.* [Discussions at the 1921 annual meeting of the Forest Society of Franche-Comté and Belfort.] *Bull. Trimest. Soc. Forest. Franche-Comté et Belfort* 14: 109-174. 1921.—The following subjects are discussed in more or less detail: the climate of Alsace north of Mulhouse and its influence upon the forest vegetation; the forest organization before and after the war; the development of the Rhine River in Alsace; the forests of the Hartmann, including details of damage done by the war, the work necessary to reestablish their management, and the results accomplished to date; the forest of Ribeauville, its location, species, and the essentials for its management and yield; the forest of Freland, and the silvicultural management of a forest of mature Scotch pine with an understory of fir.—*J. Kittredge, Jr.*

335. ANONYMOUS. *Notes on Santalum album in the Chittoor District of the Madras Presidency.* *Indian Forester* 48: 32-34. *Pl.* 1-2. 1922.—To test the ability of sandal to grow non-parasitically, a pure plantation was established surrounded by a trench so that the roots could have no connection with other plants. The sandal is flourishing quite as if parasitic, no "spike" has developed, and individual plants have grown rapidly.—*E. N. Munns.*

336. ANONYMOUS. *The National Geographic Society completes its gifts of big trees.* *Nation. Geog. Mag.* 40: 85-86. 1921.—A statement is given of the activities of the National Geographic Society in the preservation for the American people of 1916 acres in Sequoia National Parks, "containing the finest stand of *Sequoia washingtoniana* in the Sierra."—*W. M. Atwood.*

337. ANONYMOUS. *Vade-mecum du forestier.* [Foresters' hand book.] 192 p. Société Franche Comté et Belfort. 1921.—This handbook in pocket size for the use of French forest officers contains condensed information, much of it tabulated, under the following headings: calendar of forest activities; arithmetic and practical geometry; physics as it relates to forestry; volume measurements and estimating; grading, uses, and products of wood; improvements and planting; and miscellaneous useful information.—*J. Kittredge, Jr.*

338. ANONYMOUS. *Forests in relation to stream flow and erosion.* [Rev. of: BATES, C. G., and A. J. HENRY. *Stream-flow experiment at Wagon Wheel Gap, Colorado.* *Monthly Weather Rev. Suppl.* 17. 55 p. Government Printing Office: Washington, 1922.] *Nature* 109: 417. 1922.—The number of stations used for rainfall record is not large enough to warrant implicit confidence in the results.—*O. A. Stevens.*

339. ANONYMOUS. [Rev. of: HANSON, C. O. *Forestry for woodmen.* 2nd ed., 238 p., 19 pl. Clarendon Press: Oxford, 1921.] *Nature* 109: 547. 1922.

340. ANONYMOUS. *Marine borers in San Francisco Bay.* [Rev. of: Report on the San Francisco Bay marine piling survey prepared under the supervision of the San Francisco Bay Marine Piling Committee of the American Wood-Preservers' Association. BLAKE, E. M.

Introduction. GRUNSKY, C. E. Hydrographic phase—the hydrography of San Francisco Bay. KOFOID, CHARLES A. Biological phase—the marine borers. HUNT, G. M., and C. L. HILL. Engineering phase—pile protection materials and methods. 104 p., 36 pl. 1921.] *Nature* 109: 426-428. 1922.

341. ALGAN, H. Nos bois coloniaux. [Our colonial woods.] *Bull. Trimest. Soc. Forest. Franche-Comté et Belfort* 14: 271-279. 1922.—A résumé is given of 2 pamphlets by André Bertin, who estimates that France will require importations of wood at the rate of 8 million cubic m. per year for the next few years. This amount can best come from the French colonies of the Atlantic, where the forests cover 60 million hectares,—12 million in the Ivory Coast, 30 million in Gabun, 12 million in Kamerun, and 5 million in Guiana. The 30 million hectares additional in Madagascar and Indo-China are too far away. Since the war a study has been made of the special qualities and usefulness of 500 species of trees from the colonies. A table indicates those suitable to replace species now in use. They are classified as substitutes (1) for poplar and yellow poplar, (2) for pine and fir, (3) for oak and teak, (4) for beech, hornbeam, and sycamore, (5) for elm, ash, and acacia, (6) for cabinet woods, and (7) for woods suitable for railroad ties, mine props, piles, etc. The common names, scientific names, country in which produced, average density, and characteristic color of each wood are given. The forests contain on the average 60 trees per hectare of 30 cm. diameter and over, with a volume of 250 cubic m., of which 150 cubic m. can be utilized. A plan for the management of the colonial forests will place at least 40 per cent of the total area of each colony under government control. Concessionaires will be obliged to leave in every parcel cut over a specified number of seed trees of desirable species.—*J. Kittredge, Jr.*

342. ALGAN, H. Sur la densité des sapinières. [Concerning the density of fir forests.] *Bull. Trimest. Soc. Franche-Comté et Belfort* 14: 242-244. 1922.—An indication as to what should be the normal number of stems per hectare of a given size in a complete and regular stand of fir may be secured as follows: 2 trees of equal diameter d grow at a distance apart trunk to trunk of D , such that $D = 10d + 1$ m. If the neighboring trees are not of the same diameter, the average of their diameters should be used for d . Assuming that a fir tree covers an area S equal to the square of the diameter of its crown, then $S = (10d + 1)^2$, and the number of trees per hectare will be $N = \frac{10,000}{(10d + 1)^2}$. A table is given based on this equation showing the number of trees per hectare from 10 to 60 cm. diameter breast high. It also gives for each diameter class the basal area per hectare. For various causes the increase in material is suspended when the stems measure from 40 to 45 cm. diameter breast high and the stand approaches $\frac{2}{3}$ of its normal volume at maturity.—*J. Kittredge, Jr.*

343. BARBEY, A. L'épicéa et la sécheresse de 1921. [Spruce and the drought of 1921.] *Bull. Trimest. Soc. Franche-Comté et Belfort* 14: 237-241. 1922.—The facts are outlined which caused the recent dying of spruce. Spruce requires considerable atmospheric humidity and frequent summer rains and consequent fresh soils to thrive and resist insect attacks. In introducing it on plains and shallow soils with summer droughts there is danger from droughts or from accompanying insect damage, such as occurred in 1907, 1911, and 1921. The bark beetles, weevils, long-horned beetles, and buprestids attack trees in full vitality only in exceptional cases. Brief descriptions are given of the attacks of *Tomicus typographus*, *T. chalcographus*, *Hylesinus polygraphus*, *Pissodes harcyniae*, *Collidium luridum*, and *Anthaxia quadripunctata*. The remedies are: avoid introducing spruce at low elevations in dry climates, and encourage the development of full-crowned trees without serious crowding or shading. If the trees are attacked they should be cut and the bark removed and burned at once.—*J. Kittredge, Jr.*

344. BOURNE, R. A dissertation upon forest finance. *Indian Forester* 48: 1-14. 1922.—The theory that the short rotation for forest crops for Indian species is most profitable is challenged and a detailed working out of the formula shows that the longer rotation gives the greater financial return. Examples are given to support the author's contention.—*E. N. Munns.*

345. BOUTILLY, V. La cause de la déformation des cèdres dans l'Atlas mitidjien. [The cause of the malformation of the cedars in the Atlas Mitidjen Mountains.] Bull. Sta. Recherches Forest. Nord Afrique 1: 218-221. Fig. 1-3. 1921.—*Cedrus atlantica* occupies a limited area about 8 km. long by 2 or 3 km. wide along the crest of the Atlas chain, at about the elevation of Blida. The forest is characterized by the deformation of all the old trees, which have lost their terminal shoots to have them replaced by several laterals, which results at the age of 30 or 40 years and over in a form of tree with numerous bayonet-like trunks which are useless for logs. The young trees less than 50 years old are straight and do not have this form. Within the last 3 or 4 years there has been a serious epidemic of a weevil (*Thaumatopoea pityocampa*) which has killed the leading shoots. Apparently this was the cause of the deformation of the older trees 50 years ago.—J. Kittredge, Jr.

346. BROOKS, A. The breaking strain of timbers. Agric. Gaz. New South Wales 32: 463. 1921.—The breaking stress of red ironbark [*Eucalyptus sideroxylon*], grey box [*E. hemiphloia*], and cypress pine [*Callitris* sp.] is compared with American white pine [*Pinus Strobus*].—L. R. Waldron.

347. BROWN, NELSON COURTLANDT. The place of utilization in American forestry. Jour. Forestry 20: 135-138. 1922.—Because of the great savings in the consumption of wood which are possible through the use of lower grades, better usage of materials, more careful methods in manufacture, and the use of wood preservatives, more attention should be given by the schools to forest utilization. Some schools are working to that end now, but more stress should be placed upon the subject as more and more men are entering the lumber industry.—E. N. Munns

348. BROWN, W. H. Minor products of Philippine forests. Forest. Bur. Philippine Is. Bull. 22¹. 432 p., 28 pl. 1920; 22². 410 p., 73 pl. 1921; 22³. 329 p., 26 pl. 1921 [1922].—This comprehensive, copiously illustrated work makes readily available a previously undigested mass of economic data on Philippine economic plants. The work is published in 3 volumes, each complete in itself, the 3rd presenting a complete index to all local and scientific names. The subjects covered are mangrove swamps, palms and palm products, bamboos, fiber plants, sources of paper pulp, resins, gums and oils, wild food plants, natural dyes, ornamental plants, soap substitutes, official medicinal plants, poisonous plants, miscellaneous useful plants, edible fungi, and medicinal uses of Philippine plants. Certain subjects have been treated by specialists, such as E. D. MERRILL, O. A. REINKING, LEON MA. GUERRERO, A. F. FISHER, and A. P. WEST.—E. D. Merrill.

349. C., S. Z. Der Ertrag der sächsischen Staatsforsten. [Yield of Saxony state forests.] Deutsch. Forstzeitg. 37: 381. 1922.—The production of the state forests decreased 11 per cent during the decade 1837-1846 in spite of a slight increase in area. In succeeding decades the stock was increased considerably, amounting to 27,000,000 cubic m. in 1873; at that time the rotation was lowered. Heavy cuttings caused deterioration of site conditions, and this, together with smoke from industrial plants and difficulties in securing natural reproduction resulted in a present growing stock nearly 15 per cent below normal. To restore a normal stock within a period of 25 years will require a net increase of 120,000 cubic m. per annum, and since the increment is 620,000 cubic m. this will permit an annual cut of 500,000 cubic m.—W. N. Sparhawk.

350. CHAMPION, F. W. The conversion of coppice and coppice-with-standards to high forest. Indian Forester 48: 15-22. 1922.—The arguments for and against conversion of coppice forests are listed. Those against conversion are listed as financial, economic, and technical. Under Aubert's system, which is given in detail, most of the disadvantages disappear. It is practicable and economical and is particularly applicable to areas of good quality coppice in which the inroads of the war upon the standards have been heavy.—E. N. Munns.

351. CHUN, W. Y. *Chinese economic trees*. xxviii + 309 p, 100 pl. The Commercial Press: Shanghai, China, 1922.—Brief descriptions of about 300 species are given. In many genera additional species are listed or mentioned. One hundred species are figured. New names are *Phoebe chinensis* Chun (*P. macrophylla* Gamble, non Blume), *Hicoria cathayensis* (Sargent) Chun (*Carya* Sargent), and *Amelanchier sinica* Chun (*A. asiatica* var. *sinica* Schneider).—*E. D. Merrill*.

352. COUPIN, HENRI. *Les forêts au point de vue biologique*. [Forests from the biological standpoint.] *La Nature* 50²: 157-159. 1922.

353. DAVIS, W. M. *Lower California and its natural resources*. [Rev. of: NELSON, EDWARD W. *Lower California and its natural resources*. Mem. Nation. Acad. Sci. [U. S. A.] 16: 1-194. 1921.] *Geog. Rev.* 11: 551-562. 1921.—In this review the main emphasis is on geologic and geographic features with some mention of the forests and other types of vegetation, such as grassland and desert.—*S. B. Shaw*.

354. DAWKINS, C. G. E. *Big Hnaw* (*Adina cordifolia*) and *teak trees*. *Indian Forester* 48: 108-110. 1922.—The measurements of 2 large trees are given; the Hnaw was 23 feet 6 inches in girth at 4.5 feet and the teak 18 feet 2 inches in girth.—*E. N. Munns*.

355. DESCOMBES, PAUL. *La forêt régulatrice et génératrice des eaux*. [The forest as a regulator and generator of waters.] *Rev. Eaux et Forêts* 59: 139-142. 1921.—Forests affect the waters in 2 ways: (1) by making their flow more regular, and (2) by increasing their abundance through dews and mists which are deposited in a considerably greater quantity on foliage than on bare soil. The 1st influence has been scientifically demonstrated by the Swiss forest experiment station [see *Bot. Absts.* 9, Entries 710, 1232]. It was well illustrated in 1875 by floods in the Onne and the Pique, 2 adjacent streams the watersheds of which are practically identical except that the former is about 5 per cent, the latter about 40 per cent forested. The Onne increased its discharge with great suddenness and violence from 11 to 130 cubic m. and caused a damage of several hundred thousand francs, whereas the Pique increased its discharge much more gradually from 8 to 46 cubic m. and caused a damage of not more than 6,000 francs.—The influence of the forest in increasing the abundance of waters was investigated some 60 years ago by an engineer who reported that the discharge of springs is twice as much in forested as in deforested areas, and that reforestation can increase the discharge of springs by 7 cubic m. per day for every hectare reforested. Subsequent investigations have shown that the amount of water deposited by dews and mists in forested watersheds sometimes exceeds that coming from rainfall. In the 2 streams cited, it is regarded as fair to assume that the much greater annual discharge of the Pique (1,732,000 cubic m. per square km. as against 693,000 for the Onne) is due solely to the fact that the watershed of the former is 40 per cent and the latter only 5 per cent wooded. In this region the amount of water coming from unseen condensations in the forested areas is 5 times that coming from rainfall; reforesting $\frac{1}{3}$ of a watershed would double the discharge of its waters.—*S. T. Dana*.

356. DWIGHT, T. W. *Timber administration of the Dominion Forest Service*. *Jour. Forestry* 20: 4-9. 1922.—Some 22 million acres are under the Dominion Service, which is responsible for keeping these lands productive. Careful lumbering is insisted upon, and to reduce fire danger the brush is piled and burned concurrently with the logging work. Cutting is supervised in order to insure natural reproduction. Two nurseries supply trees for prairie and forest planting, the prairie planting having been successfully encouraged for 20 years.—*E. N. Munns*.

357. GALLAND, P. *Rétablissement des forêts dévastées par la guerre*. [Re-establishment of the forests devastated by the war.] *Bull. Trimest. Soc. Forest. Franche-Comté et Belfort* 14: 72-75. 1921.—The forests in the district of Saint-Dié were badly mutilated, in some cases considerable areas being completely destroyed. The dead wood should be utilized

at once, both to effect economy and to facilitate planting. In some places leveling the ground must precede planting. Trenches and dugouts have caused an increase in floods and a serious problem in the erosion and deposition in valleys. When the ground surface has been re-established it is planned to plant fir in the proportion of at least 80 per cent where there is some shrubby vegetation for protection. Lacking this, seed of *Genistae* will be sown to provide shade, in which fir seed will be sown or nursery stock 15 to 18 cm. high planted, spaced 2 m. apart.—J. Kittredge, Jr.

358. GLASSON, A. K. Mortality of sal in Buxa Division, Bengal. Indian Forester 48: 22-32. 1922.—The abundance of dead sal was found to be due to the overflowing of rivers, and heavy mortality from climbers, windfall, and insects. Regulation of the cut, a revised scheme of creeper cutting, and insect control reduced the amount killed. The fungus *Polyporus Shoreae* was found to be causing damage, but the investigations of its action have not been completed. This fungus promises to be a serious factor in plantations.—E. N. Munns.

359. GRANT, MADISON. Saving the redwoods. Nation. Geog. Mag. 37: 519-536. 10 fig. 1920.—A discussion of the forests of *Sequoia sempervirens* in northwestern California and southern Oregon is given with a description of the life habits of the tree. A plea is made for the preservation of these forests.—W. M. Atwood.

360. HAUSENDORF. Der Langenbrander Schirmkeilschlag von Forstmeister Dr. Eberhard und der Wagnersche Blandersaumschlag in Gaildorf. [The Langenbrand shelterwood-wedge system of Dr. Eberhard and the Wagner border-strip felling in Gaildorf.] Zeitschr. Forst.-u. Jagdw. 53: 474-482. Fig. 1-3. 1921.—Witzbach and the author visited both areas. Witzbach prefers Eberhard's system, for 3 reasons: it provides the forester with more managerial freedom, makes better use of the road system, and under it the silver fir at Gaildorf can be more easily retained. Hausendorf finds no basis for comparison, since it is not possible to compare an organic whole, the border-strip system, with a part of such a whole, the wedge system, the only object of which is to secure improved methods of removing timber from the forests. Advantages and disadvantages of the Wagner system are discussed.—J. Roesser.

361. HAWLEY, R. C., E. I. TERRY, and K. W. WOODWARD. Forest region and type classification for New England. Jour. Forestry 20: 122-129. 1922.—This report of a committee divides New England into 3 regions and specifies for each the types, with a description of the composition, origin, location, and importance of each of the forest types. Seven tree types are recognized, which are classified by topographic conditions, species, mixtures, or importance.—E. N. Munns.

362. HENRIEY. Le hêtre à Plancher-les-Mines. [Beech at Plancher-les-Mines.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 76-79. 1921.—An account is given of marking, the forest being composed of fir in mixture with beech or in mixtures with fir, beech, ash, maple, and elm; the last 3 are favored in the marking. Beech is marked more heavily than fir because the latter is utilized for lumber and dimension stock and has a higher value. Beech is of inferior quality and is used little except for firewood. The proportion of species in this forest is: fir 37 per cent, spruce 17, beech 34, and miscellaneous hardwoods 12. Beech occupies more space than fir of equal diameter and, hence, has a smaller volume per unit of area. The growth of fir forest, after the trees are over 60 cm. in circumference, is more than 5 times that of the beech forest.—J. Kittredge, Jr.

363. HOLMGREN, A. LEO. Stormhärjningen Hösten 1917 å Älvdalens Besparingsskog. [A storm in the Älvdal forest in the autumn of 1917.] Skogsvårdstidn. Tidskr. 19: 172-178. Fig. 1-3. 1921.—The article gives an account of the damage wrought by a severe storm in Dalarne, Sweden. Tables and graphs show the number of windfalls and damaged trees by species, diameter, and height classes.—G. A. Pearson.

364. HOWARD, S. H. **Thinnings.** *Indian Forester* 48: 110-112. 1922.—An answer is given to some of the criticisms of thinning methods. It is not necessary to make heavy thinning in a stand which has been thinned from the beginning, but it is necessary when previous thinnings have been neglected.—*E. N. Munns.*

365. HOWE, C. D. **Our forest conditions and some of our forestry problems.** *Ann. Rep. Quebec Soc. Protection Plants* 14: 23-30. 1922.—“Briefly our forest conditions present this problem: Shall we accept for our lumbering and pulpwood industries the wood of constantly decreasing quality which nature unguided produces when the equilibrium in the forest has been upset by fire, disease or logging operations, or shall we exert intelligent effort to maintain our pine, spruce, and other valuable forests and thus supply the forest industries with wood of incomparable quality particularly adapted to their needs?”—*B. T. Dickson.*

366. JOANNIS, J. DE. **Les chenilles des cônes de cèdre.** [The cone weevils of cedar.] *Bull. Sta. Recherches Forest. Nord Afrique* 1: 187-199. *Pl.* 19-20. 1921.—Various species of the genus *Dioryctria* which seriously damage the Algerian cedar are described.—*J. Kittredge, Jr.*

367. KHAN, ABDUL AZIZ. **Charcoal making in the Central Provinces.** *Indian Forester* 48: 102-104. *Pl.* 7. 1922.

368. MER, ÉMILE. **Possibilité par volume.** [Regulation by volume.] *Bull. Trimest. Soc. Forest. Franche-Comté et Belfort* 14: 6-24. 1921.—Regeneration cuttings are not suited to the fir forests of the Vosges Mountains because the winds are too violent, the cutover areas are too readily invaded by brush, and the fir is not sufficiently fertile. Sustained yield should be abandoned for it constitutes, especially in irregular stands, an obstacle to cultural operations which too often cannot be undertaken in time to be effective. There results a serious loss of production. With the sustained yield the regulation by volume, which serves only to establish it, would also disappear. The cutting cycle should be so arranged that blocks are cut over on short rotation at frequent intervals so that mature trees can be exploited where they are too numerous, thinnings made in young stands, young growth disengaged, and openings planted.—*J. Kittredge, Jr.*

369. MILLAR, W. N. **Status of forestry in western Canada.** *Jour. Forestry* 20: 10-17. 1922.—The work of the past 5 years by foresters in western Canada is reviewed in which the progress in administration, protection, and development are outlined. The 3 most important developments are the disposal of slash, cooperative live-stock grazing, and the use of the airplane patrol in fire protection. Other work which has been developing more slowly includes forest and utilization investigations, nursery practice, forest surveys, and the establishment of a forest school.—*E. N. Munns.*

370. NOWACK, ERNEST. **A contribution to the geography of Albania.** *Geog. Rev.* 11: 503-540. 1921.—In an extended description of Albania the forest, brushwood, maqui, and heath vegetation are discussed in relation to altitude and precipitation.—*S. B. Shaw.*

371. OSMASTON, A. E. **The mensuration of plantations.** *Indian Forester* 48: 74-78. 1922.—The ordinary formulas given for the number of plants per acre do not include the space left at the edges of these areas and the increased growth secured by border trees. New formulas are developed and examples given for determining correctly the true number involved.—*E. N. Munns.*

372. PEUTZ, VON. **Die Entwicklung der Klenganstalten in den letzten 25 Jahren.** [The development of seed-extracting establishments in the last 25 years.] *Zeitschr. Forst- u. Jagdw.* 53: 257-277. *Charts* 1-5. 1921.—A description is given of the seed-extracting establishments of Eberswald, Annaburg, and Klausenau constructed within the past 25 years which

shows the improvement from the compartment or box type of kiln to the cylindrical kiln with preliminary drying chambers. Haack's experiments show that the danger to which the seed is subjected by the heat in drying is directly proportional to the percentage of moisture in the cones. It has also been established that the origin of the seed is of great importance, even though the climatic variation in Prussia does not exceed 1°C. Seed from different sources should be kept separate. Small extracting establishments are desirable and to avoid the old compartment form a "safety seed extracting kiln" has been placed on the market for small operators. This is described and illustrated in detail. Its chief feature is 3 drying compartments: the upper, where the cones are subjected to 40°C until $\frac{1}{4}$ open; the middle, where 50°C is maintained until the cones are $\frac{3}{4}$ open; and the drum proper where a temperature of 55°C is maintained until all seed is removed. The capacity of this establishment is about 2,000 kgm. of seed during the operating season from Dec. 15 to May 1. It has marked advantages over the old method of seed extraction and the health of the operator is not impaired by working in intense heat and dust.—*J. Roeser, Jr.*

373. PRATT, MERRITT B. *Shade and ornamental trees of California.* 130 p., 137 pl. California State Bd. Forest. 1922.—A description is given of 152 native and exotic trees with large plates of the more important ones planted in California. Species suitable for planting in different localities in the State are listed by regions.—*E. N. Munn.*

374. R[ECKNAGEL], A. B. [Rev. of: BRUCE, DONALD. *A white fir volume table.* California Agric. Exp. Sta. Bull. 329. 41-45. 1921.] *Jour. Forestry* 20: 75. 1922.

375. R[ECKNAGEL], A. B. [Rev. of: FISHER, RICHARD T. *The management of the Harvard Forest, 1909-1919.* Harvard Forest Bull. 1. 27 p. 1921.] *Jour. Forestry* 20: 75-77. 1922.

376. RECKNAGEL, A. B. [Rev. of: HAASIS, F. W. *Relations between soil type and root form of western yellow pine.* Ecology 2: 293-303. 1921.] *Jour. Forestry* 20: 147-149. 1922.—While the author did not find a correlation between growth water and root form, the general character of the root system is induced by the conditions under which the tree has developed. Branching and different root forms are more the result of external conditions than the response to soil. Root competition in the semi-arid regions is worth considerable study as it is probably of more importance than the light relationship.—*E. N. Munn.*

377. REYES, TERESO. *La agricultura de Mexico esta en peligro de desaparecer a causa de la destrucción de los bosques.* [Mexican agriculture in danger of disappearing because of the destruction of the forests.] Rev. Agric. [Mexico] 6: 275-280, 338-343, 396-397. 4 fig. 1921.—Popular.—*John A. Stevenson.*

378. ROGERS, WALTER E. *Ice-storms and trees.* Torreya 22: 61-63. 1 fig. 1922.—Two ice-storms occurring in central Wisconsin in February and March, 1922, were studied with regard to their effect on forest trees. Twigs of 13 trees were compared as to increase in size due to ice, ranging from 950 per cent in *Tilia americana* to 226 in *Quercus alba*. Twigs of 21 species showed a weight of ice varying in its ratio to the weight of the twig from 132:1 in *Ulmus americana* to 5:1 in *Quercus rubra*. Leaves of *Q. alba* showed a weight of 44:1, and needles of *Pinus laricio* 95:1. Wide variation in amount of damage was observed.—*J. C. Nelson.*

379. SCHAEFFER, A. *Comment les forêts s'enrichissent.* [How forests enrich themselves.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 269-270. 1922.—Data are given to show the results of marking in the Haute-Saône in 1883-85 and in 1921. The number of coppice stems reserved on an area of 112,000 hectares has been increased from 72 to 82 per hectare, of small standards from 34 to 78, and of large standards from 5 to 10. At the same time the average number of trees sold and cut per hectare has been increased from 40 to 56. Thus the forestry ideal of increasing growing stock and at the same time increasing yield has been realized.—*J. Kittredge, Jr.*

380. SCHAEFFER, [A]. *La sylviculture en Haute-Saône*. [Silviculture in the Haute-Saône.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 244-248. 1922. [A verbatim reprint of a publication of the Agricultural office of the Prefecture of Haute-Saône.]—The forests of Haute-Saône occupy 31 per cent of its area. Most of them are managed as coppice under standards, which is particularly suitable for private owners because both saw timber and firewood are produced. Marking is the most important operation in these forests. Since charcoal wood has fallen in price, the marking of coppice trees to be reserved should be made heavier, up to 200 or 300 per hectare. All vigorous standards should also be reserved. Cleanings are very desirable where possible. In the small woods of high forests, thinnings should be made every 6 or 8 years, by which 2 or 3 times the production of wood can be secured. The introduction of fir in the coppice stands on poor sites in the mountains should be encouraged. A fir forest may always be expected to yield twice as much revenue as one of oak. The sterile, uncultivated fields of the hill country should be reforested with carefully selected species. Poplars can be planted to good advantage in marshy lands along streams.—*J. Kittredge, Jr.*

381. SEAMAN, L. N. *Note on the relative strength of spruce red wood and spruce white wood (Picea morinda)*. Indian Forester 48: 34-42. Pl. 3-4. 1922.—Two tests were made to determine the strength of spruce for railway sleepers, one to determine spike-holding power, the other to establish strength, stiffness, and toughness. Red wood, the dense of the 2, proved the better for this purpose.—*E. N. Munns.*

382. SEURRE. *Les forêts françaises et les bois de papeterie*. [French forests and wood for paper pulp.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 229-236. 1922.—The French paper pulp industry consumes annually about 3,150,000 steres (stacked cubic m.) of wood. The French forests occupy at present an area of 10,100,000 hectares, of which 74 per cent is coppice and the rest high forest. The woods suitable for manufacture of paper pulp are spruce, fir, Scotch pine, black pine, Austrian pine, aspen, birch, poplars, and Eucalyptus. The fir and spruce forests have an area of 950,000 hectares, the average annual growth being 3-4 cubic m. per hectare; $\frac{3}{10}$ of this, —1,282,500 cubic m.,—would be available for paper pulp. The pine forests cover 285,000 hectares. Growth averages 3 cubic m. per hectare per year, $\frac{3}{4}$, —285,000 cubic m.,—being available for paper pulp. Aspen occurs in the proportion of $\frac{1}{10}$ in the coppice forests, occupying 3 million hectares. The growth of these forests is 2 cubic m. per hectare per year, and $\frac{1}{2}$ of the aspen, —300,000 cubic m.,—is available annually for paper pulp. Birch can furnish 80,000 cubic m. additional. Poplars will furnish 100,000 and Eucalyptus 20,000 cubic m., so that the total production of wood for paper pulp is estimated at 2,117,500 cubic m. as compared with a consumption of 2,079,000 cubic m. France may, therefore, be expected to be self-supporting in pulpwood production. A recent process indicates that maritime pine, after a preliminary extraction of the resin, can also be used for paper pulp. This would make available an additional 905,000 cubic m. of pulp wood.—*J. Kittredge, Jr.*

383. SPAETH, J. NELSON. *Notes on the release of white pine in Harvard Forest, Peter-sham, Massachusetts*. Jour. Forestry 20: 117-121. 1922.—Disengagement cuttings show a marked response in white pine as in 5 years the per cent of normal healthy trees increased from 39 to 51; where no cuttings were made the per cent dropped from 51 to 22. The general health of white pine when released showed 28 per cent improved and 44 per cent the same, while without release only 3 per cent were improved and but 14 per cent remained the same. Damage other than suppression is due to the loss of terminal growth by whipping, especially in the winter season. Release is most successful when the pines average about 12 feet in height for site 2.—*E. N. Munns.*

384. STEBBING, E. P. *The forests of India and the development of the Indian Forest Department*. Indian Forester 48: 81-98. 1922.—The early history of the forestry movement in India is traced with the causes which led to the changes in the forest management. The perfected organization has developed a great resource and made the service one that can stand as a model for the British Empire.—*E. N. Munns.*

385. SUTHERLAND, JOHN. **Forestry in its national and economic aspects.** Jour. Forestry 20: 93-105. 1922.—The lack of appreciation of the United Kingdom of forests was responsible for the great shortage of timber during the war. Forests were permitted to grow as remnants of an original culled forest in small patches or in still smaller areas as plantations of various native and exotic species. Recently the Forestry Commissions have been authorized to undertake a program of afforestation which in 10 years is to cover 150,000 acres. Altogether 1,770,000 acres are to be reforested and $\frac{2}{3}$ of this amount is recommended as the aim for the next 40 years. Private capital and enterprise are to be stimulated into caring for forests through perhaps some form of subsidy, relief from taxation, protection against fire, disease, and insects, which would call for regulation of cutting later. While this area would not satisfy all local demands, it would conserve shipping, help exchange, retain capital, and help to solve a problem of the development of rural areas.—*E. N. Munnis.*

386. TRABUT, L. **Utilisation des Eucalyptus dans le Nord de l'Afrique.** [Utilization of eucalyptus in Northern Africa.] Bull. Sta. Recherches Forest. Nord Afrique 1: 202-210. 1921.—Eucalyptus woods, chiefly of *E. globulus*, grown in north Africa have met with unjustifiable disfavor. *E. rostrata*, *E. rudis*, *E. teretincornis*, and more rarely *E. punctata*, *E. collossea*, and *E. diversicolor* have been planted. As an example of the possibilities of Eucalyptus wood, the author gives the results of planting operations and successful utilization of different species of *Eucalyptus* in California, including use for railroad ties, marine piling, telegraph poles, boards, cabinet wood, and firewood. *E. occidentalis* var. *astringens* is being exploited largely in Australia for tannin, of which it yields more than *Acacia*. Eucalyptus is also useful for planting in wet and brackish soils. Crosses are frequently more resistant and grow more rapidly than the non-hybrid species. Recommendations are included of the most suitable species for planting in northern Africa.—*J. Kittredge, Jr.*

387. WALKER, A. H. **Thinning of deodar.** Indian Forester 48: 78-80. Diagr. 1922.—Measurements of deodar heavily thinned show that the tree can be released from suppression and that it will respond quickly to the stimulus of an open stand.—*E. N. Munnis.*

388. WATIER, CH. **Les Cupressinées dans le Maroc méridional.** [Cupressineal in southern Morocco.] Bull. Sta. Recherches Forest. Nord Afrique 1: 222-240. 1921.—*Callitris quadrivalis*, *Juniperus phoenicea*, *J. Oxycedrus*, *Cupressus sempervirens*, and *Argana sideroxyylon* form the most important part of the forest flora of southern Morocco. They occur under similar conditions and in the same localities, but usually with one or other of the species dominant. Each has a wide altitudinal range and is indifferent to aspect. Differences in the mineral constituents of the soil apparently account for the fact that in a good locality one of these species usually attains superiority and the others are eliminated. For each of the conifers a discussion is given of the characteristics of the tree and of the forests and their occurrence in the region. The forests of *Callitris* are the most important at present. Many of these forests are being heavily tapped for the resin, which is the basis for sandarac. The possibilities of exploiting these forests, the cultural operations which should be undertaken, the economic advantages, and the by-products,—particularly sandarac,—are discussed. A table is given of the exportations of this gum to foreign countries from 1913 to 1917.—*J. Kittredge, Jr.*

389. WEBSTER, A. D. **The Sitka spruce in Sussex.** Gard. Chron. 71: 79. 1922.—Notes are given on a planting of 14 acres made at Sussex about 1908.—*P. L. Ricker.*

390. WEIBECKE. **Ostdeutscher Kiefernwald. Seine Erneuerung und Erhaltung.** [East German pine forests. Their renewal and retention.] Zeitschr. Forst- u. Jagdw. 53: 294-305. 1921.—The subject of seed cultures is taken up under the sub-headings (1) soils upon which sowing can be done, (2) time of sowing, and (3) the seed. Sowing of forest seed is generally practicable. Poor results are avoided to the extent that sparse and valuable humus is conserved, collected, and mixed in the drill furrows. The necessity of planting occurs on only

about 10 per cent of the cultural areas. Soil impoverishment may be combated by (1) water conservation through early soil preparation, (2) prompt seasonal sowing in the spring, (3) packing of forest litter as a fertilizer. Pine seed must be in the soil by the 10th or 15th of April, when there is the desired soil moisture and temperature. Pine seed swells in 8-10 days at 10-15°C.; it germinates best when the sun heats the soil to 20-25°C. for a few hours daily. Nurseries should be sown about April 8 and planting done between March 25 and April 15, at the latest April 25. Only once in 31 culture years has the author lost an early sowing on a sunny site by frost-killing of the germinating seed. The best seed is obtained from cones allowed to open naturally, collected from fellings in advanced pole-wood and in mature stands. If stands have been thinned and branchy material removed, good origin and heritage is assured. Commercial seed extracting establishments often deliver seed of various germinative powers collected in different years, all intermixed. This is allowed as long as the guaranteed germinative power is obtained from the whole. It is recommended that every forest superintendent collect his own seed from fellings and thinnings in mature and pole stands over 60 years old. Cones collected earlier contain unripened seed.—*J. Roesser, Jr.*

391. WICKENHEISER, HERBERT C. Notes on a growth of young white birch. *Torreyia* 22: 84-86. 1922.—A cinder-filled swamp area at the south end of Van Cortlandt Park in New York City is occupied by a growth of *Betula populifolia* Marsh. About 1000 trees are found over an area of 10 acres. The average height is 24½ inches, and diameter of stems 6 inches above the ground ¼ inch. The tallest are about 5 years old, dating back to the filling-in of the swamp. The nearest birch trees are about ½ mile to the north.—*J. C. Nelson.*

392. WILSON, ELWOOD. Forest mapping and estimating from aerial photographs. *Jour. Forestry* 20: 113-116. 1 fig. 1922.—A hydroplane was used in making a survey of 140 square miles of forest land away from communication. The flying done at 5000 feet gave very accurate results when checked against ground studies. Costs under this method were less.—*E. N. Munns.*

393. WOOD, B. R. Artificial regeneration of sal in Gorakhpur. *Indian Forester* 48: 53-67. 1922.—Sowing and planting of sal has been attempted for 8 years, and observations show that sal seed has considerable vitality if placed ¼-½ inch in moist earth. Without proper moisture sal lies in the soil several months before germinating. Root and shoot planting is a failure, but great success followed seed sowing in the forest. Sal apparently prefers full light and responds readily to it, though able to persist where the shade is not too heavy.—*E. N. Munns.*

394. WOOLSEY, T. S. JR. Public forestry on private land. *Jour. Forestry* 20: 130-134. 1922.—Forest devastation can probably be best stopped by direct federal control; the second best means is by federal cooperation with state agencies. But where unimproved forest land is neither being devastated nor intelligently managed there should be some method of state protection and improvement at the risk of the holder. An act for this purpose is given which provides for the necessary management of certain private land with and without the application of the holder; the return of the property after a minimum period with reimbursement for necessary outlays; the purchase of the land if the costs are not paid.—*E. N. Munns.*

395. WOOLSEY, T. S. JR. [Rev. of: BENSKIN, E. Afforestation in the United Provinces. Government Press: India, 1921.] *Jour. Forestry* 20: 146. 1922.—The erosion in the Gangetic Plain resulting from deforestation makes necessary reforestation methods similar to those used in the French Alps. Forest planting is progressing slowly and so far has been successful.—*E. N. Munns.*

396. WOOLSEY, T. S. JR. [Rev. of: BLOLEY, H. E. L'aménagement des Forêts par la méthode expérimentale et spécialement la méthode du contrôle. (Forest management by the experimental method especially the method of control.) 90 p. Attinger: Paris, Date?] *Jour.*

Forestry 20: 144-145. 1922.—The forests of silver fir should be managed as an experimental area and be constantly under observation in order to determine maximum growth.—*E. N. Munns.*

397. W[oolsey], T. S. Jr. [Rev. of: FISHER, RICHARD. T. *The management of the Harvard Forest, 1909-1919.* Harvard Forest Bull. 1. 27 p. 1921.] Jour. Forestry 20: 77-78. 1922.

398. W[oolsey], T. S. Jr., and R. Z[on]. *Forest mensuration.* [Rev. of: CHAPMAN, HERMAN H. *Forest mensuration.* xxii + 553 p. J. Wiley and Sons: New York; Chapman & Hall Ltd.: London. 1921.] Jour. Forestry 20: 139-144. 1922.—The book is designed for school use and is far superior to other works so far published. Discussions of older methods and illustrations should be included in an appendix as some of the subject matter is apt to be confusing. The use of the board foot in American work is decidedly unfortunate as it brings into the mensuration work many difficulties in calculation.—*E. N. Munns.*

399. WRIGHT, H. L. *Forest fires caused by landslips.* Indian Forester 48: 110. 1922.—A fire was seen starting in dry grass which could have been caused only by sparks from falling rocks in a landslip.—*E. N. Munns.*

400. ZAVITZ, E. J. *Reforestation in Ontario.* Jour. Forestry 20: 18-24. 1922.—Two problems of reforesting are involved, private lands in southern Ontario, Crown lands in the Laurentian plateau. On private lands, remittance of taxes, education, demonstration areas, and tree distribution from governmental nurseries are responsible for a growing appreciation of what can be done. Municipal forests are being established, the management being turned over to the provincial foresters. On the Crown lands reliance has been placed on natural regeneration, but this has not proved sufficient and must be supplanted by artificial means.—*E. N. Munns.*

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 4, 11, 25, 27, 31, 32, 44, 74, 80, 85, 91, 96, 105, 108, 115, 182, 196, 197, 215, 227, 229, 304, 386, 486, 508, 509, 510, 515, 539, 655, 664, 687, 697, 703, 808, 830, 843, 913, 915, 923)

401. ANONYMOUS. *Growth and sex-factors of racial character.* Nature 109: 389. 1922.—An abstract is presented of a paper read by Miss R. M. FLEMING at the Royal Anthropological Institute Feb. 28, 1922, with report of a brief discussion.—*O. A. Stevens.*

402. ANONYMOUS. *Prof. Rolfs writes of unique citrus trees in Brazil.* California Citrogr. 7: 13. 1921.—P. H. ROLFS, in a letter to A. D. Shamel, describes briefly a "freak" orange tree found at Morro Velho, Brazil. Several branches bear fruits with "etiolated" or colorless segments, but the leaves are normal.—*Howard B. Frost.*

403. ANONYMOUS. *A new view of fertility.* [Rev. of: PELL, C. E. *The law of births and deaths: being a study of the variation in the degree of animal fertility under the influence of the environment.* 192 p. T. Fisher Unwin: London, 1921.] Nature 109: 267-268. 1922.

404. ADAMS, C. D. *Avocado varieties committee submits new report.* California Citrogr. 7: 310-311, 322. 1922.—In connection with descriptions of varieties it is stated that it is increasingly probable that the "ideal" type of avocado will result from hybridization between the Guatemalan and hardy Mexican types. Some such hybrids have already been produced.—*Howard B. Frost.*

405. ANDERSON, W. S. **Vitality of spermatozoa.** Kentucky Agric. Exp. Sta. Res. Bull. 239. 36 p. 1922.—(1) The vitality of the spermatozoa of some domestic animals. The semen of a fertile horse contains numerous active spermatozoa. When a number of inactive spermatozoa are present in semen, it is an indication of partial sterility. The presence of a considerable proportion of inactive spermatozoa is invariably an indication that a large percentage of females mated will not conceive. Certain males produce an abundance of sperms all inactive. A considerable number of males were found in which no sperms could be found in the semen. Under laboratory conditions at temperatures varying from 0 to 46°C. spermatozoa usually did not remain active for over 8 hours. The period of activity is only slightly greater after normal insemination. The addition of acid in small quantities to semen reduces the activity of the sperm. The average pH value of the semen of 7 normal males was 7.31 and of 5 sterile males 7.58. (2) The vitality of the spermatozoa of some sea animals. The spermatozoa of the oyster (*Ostrea virginica*) and the hard shell clam (*Venus mercenaria*) are immobile in the sex glands and the seminal fluid but become active in contact with sea water; sodium chloride is the activating agent. Dilute alkaline solutions are apparently not injurious to the spermatozoa. The spermatozoa are active in a 15 per cent solution of ethyl alcohol in salt solution. Very dilute solutions of acids are injurious to the spermatozoa.—W. D. Valleau.

406. BREMER, G. **Een cytologisch onderzoek van eenige soorten en soorts-bastaarden van het geslacht Saccharum.** [A cytological research of some species and species hybrids in the genus *Saccharum*.] Arch. Suikerindust. Nederland.-Indië; Mededeel. Proefsta. Javasuikeerindust. 1. 111 p., illus. 1922.—In growing sugarcane seedlings at the Sugar Experimental Station at Pasoeroean, Java, species hybridisation has been carried on for many years. Crossings were made between genuine wild species of *Saccharum* (for instance *S. spontaneum*) and the usually cultivated varieties of *S. officinarum*, but some wild varieties were also used which are probably species hybrids.—The author found that the species of this genus hitherto examined have different chromosome numbers, and that a classification based on the chromosome numbers corresponds with one based on outer morphological characteristics.—The author found that the haploid number of chromosomes in pollen mother cells of *S. spontaneum*, a wild growing species, is 56. The reduction division occurs in a normal way. In 5 special varieties of *S. officinarum*, which differ widely from one another in outer characteristics, the haploid number is 40, but frequently a varying number of these chromosomes do not conjugate in the pollen mother cells; these chromosomes remain univalent and surround the gemini in the equatorial plates. The partners of the bivalent chromosomes first pass to the poles; the univalents, lagging a little, divide into 2 parts, which also pass to the poles. Daughter cells thus result with a number of chromosomes larger than the true haploid number. Probably by the homotypic division the pollen grains also get a number of chromosomes larger than 40.—*S. officinarum* often shows a high male sterility. To the author it seems not improbable that a relation exists between this sterility and the abnormal chromosome numbers and combinations in the pollen cells.—A preliminary research showed that 2 Dutch-Indian varieties of *Saccharum*, with the vernacular names of Loethers and Teboe hitam Rokan, differing in outer characteristics somewhat from *S. officinarum*, have other chromosome numbers than that of the latter species. Two varieties from British India, Chunnee, and Puckree, also differing from *S. officinarum* have ≈ 46 haploid chromosomes.—In species hybrids of other genera which have been investigated up to the present the number of chromosomes proved generally to be the total of the haploid numbers of the parents.—Highly fertile hybrids of *S. officinarum* \times *S. spontaneum* are easily obtained. Male sterility is rarely found, female sterility never. The author found that the somatic chromosome number of several of these hybrids was 136, the total of the diploid chromosome number of *S. officinarum* and the haploid number of *S. spontaneum*. Normal reduction division occurs, the haploid number being 68. The author thinks it probable that the normal reduction division may be the reason of the fertility of these hybrids. From morphological studies carried on at the same experiment station the conclusion had already been reached that the wild Kassoer cane was a hybrid of *S. spontaneum* and *S. officinarum*. The haploid chromosome number of Kassoer proved to be 68, in full accord with the number found in artificial crossings between these species.—In the megaspore

mother-cells of *S. officinarum* a normal reduction division was seen, from which the author concludes that a longitudinal splitting of the *S. officinarum* chromosomes in the egg cell during fecundation may be responsible for the increase in the number of chromosomes of the hybrid plants. In this case heterotriploid hybrids could be spoken of.—The volumes of the nuclei of the pollen mother-cells of *S. officinarum*, *S. spontaneum*, and *S. officinarum* × *S. spontaneum* are in accordance with the chromosome numbers.—*J. Kuyper*.

407. BUCHHOLZ, JOHN T., and A. F. BLAKESLEE. **Studies of the pollen tubes and abortive ovules of the Globe mutant of *Datura*.** *Science* 55: 597-599. 1922.—In *Datura* the $(2n + 1)$ Globe mutant complex is transmitted to less than 3 per cent of the offspring by the pollen, although half the pollen receives the extra chromosome. Similar segregation is indicated for the ovules. One-fourth the offspring of Globe × normal are Globes, but abortive ovules account for the missing Globes and make a 1:1 ratio. Thus there is greater mortality of Globe zygotes. Counts of abortive ovules in crosses made with Globes and normals suggest that 4-10 per cent of $(n + 1)$ pollen tubes enter the ovary. The authors' technique in counting and measuring pollen tubes in the styles is described. Distributions of pollen tubes in normals and Globes are shown as unimodal and bimodal curves respectively. In the Globes there is a faster- and a slower-growing group of pollen tubes, the latter probably the $(n + 1)$ group. There seems to be a selection between male gametophytes, this and other processes of developmental selection tending to cause the $(2n + 1)$ mutant to disappear.—*J. Lincoln Cartledge*.

408. DAHLGREN, K. V. OSSIAN. **Selbststerilität innerhalb Klonen von *Lysimachia Nummularia*.** [Self-sterility within clones of *Lysimachia Nummularia*.] [Abstract.] *Hereditas* 3: 200-210. 1922.—Several writers have asserted that *Lysimachia Nummularia* never, or extremely rarely, produces capsules. By pollination between individuals from different parts of northern and central Europe, it is now demonstrated, however, that fruits can sometimes be produced without difficulty. That this occurs so seldom in nature is due to self-sterility, and to the fact that all plants at a locality generally are members of the same clone. [See also Bot. Absts. 9, Entry 225.]-*K. V. Ossian Dahlgren*.

409. ELORDUY, SAMUEL TORRES. **El mejoramiento del maíz.** [Improvement of corn.] *Rev. Agric. [Mexico]* 6: 673-676. 6 fig. 1922.—Methods applicable in improving the corn crop of Mexico are popularly discussed.—*John A Stevenson*.

410. EULER, H. V., und INGVAR LAURIN. **Zur Kenntnis der Hefe *Saccharomyces Thermantitonum*.** [The yeast *Saccharomyces Thermantitonum*.] *Biochem. Zeitschr.* 102: 258-267. 1920.—The rate of growth, fermenting and inverting ability of a strain of *Saccharomyces Thermantitonum* grown in Berlin for 15 years on beer wort at 16°C. were determined. As the upper temperature limit for growth and the optimal temperature for fermentation are lower than in the original strain accustomed to high temperatures, it is concluded that adaptation to the new environment has occurred.—*H. D. Hooker, Jr.*

411. HAGEDOORN, A. L., und A. C. [HAGEDOORN]. **Species crosses in rats.** *Zeitschr. Indukt. Abstamm. u. Vererb.* 29: 97-121. 1922.—Descriptions of *Mus alexandrinum*, *M. rattus*, *M. tectorum*, and of house rats and tree rats of Java are presented, with notes on offspring resulting from certain crosses involving these forms. The characters considered in this series of matings are: light and dark belly color; black, agouti, yellow, silver, and chocolate coat color; white tail tip; and waltzing gait. Other characters, which occurred among field rats of Java and Sumatra, are discussed, namely, cream with black eyes, pale agouti and roan coat colors, and albinism. It is the authors' contention that new types arise by recombination of recessive determiners, as *aabb* from across between *AAbb* and *aaBB*, rather than by mutation.—*H. W. Feldman*.

412. HARDIN, W. L. **Outline of work in interest of avocado industry.** *California Citrogr.* 7: 204, 314-315. 1922.—A popular discussion of the need for systematic breeding of the

avocado and of the characteristics to be considered. The author especially stresses the variability of the avocado in protein content and its potential value as a source of protein. "Bud-selection" work is favored. One case of probably genetic somatic variation has been reported; a tree of the Ganter variety regularly produces black fruit on one branch.—Howard B. Frost.

413. HOOPER, J. J. **Studies of dairy cattle.** Kentucky Agric. Exp. Sta. Res. Bull. 234. 91-161. 1921.—(1) Inheritance of color markings in Jersey cattle. Sixty-six per cent of Jersey cattle are solid in color and have black tongues and switches, 12 per cent are broken in color with white tongues and switches, and 22 per cent have various combinations of color of the 3 units. Solid body color is dominant over broken, black tongue over white, and black switch over white. Apparently gray color is dominant to all other coat colors of Jersey cattle. (2) Influence of oestrus or heat on the production of milk and butter fat. J. J. HOOPER and P. E. BACON. No very decided fluctuation occurs during the period of heat. (3) Influence of age and pregnancy on the production of milk and butter fat in Jersey cows. Cows carrying a calf were found to produce slightly less milk. Young cows produce less milk and butter fat than mature cows. (4) The escutcheon in relation to production of milk and butter fat. An inspection of 1117 dairy cows shows that the selvedge type of escutcheon predominates among Jerseys while the Flandrine type is most common with Holsteins, Guernseys, Ayrshires, and Kerrys. No correlation was found between escutcheon type and milk and butter fat production. (5) The body secretions in relation to production of milk and butter fat. No correlation was found between the amount and color of body secretions found on the escutcheon, in the ears, and between the udder and thighs of dairy cattle, and milk and butter-fat production.—W. D. Valleau.

414. JEFFREY, E. C., A. E. LONGLEY, and C. W. T. PENLAND. **Polyploidy, polyspory and hybridism in the angiosperms.** Science 55: 517-518. 1922.—From investigation of known hybrids or species belonging to groups in which a great deal of natural hybridism is suspected, the conclusion has been reached that polyploidy (multiplication of the normal gametophytic number of chromosomes by 3, 4, etc.) is a common result of incompatible species crosses. In polyspory, which frequently accompanies polyploidy, the spore mother-cell, on account of irregular distribution of chromosomes at the 1st division, gives rise to more than 2 daughter nuclei,—generally 2 larger nuclei and as many as 4 smaller ones. After the 2nd division, 4 usually normal pollen grains and several small abortive grains result. Emphasis is placed upon abortive pollen which along with gigantism, mutability, polyploidy, and polyspory is offered as a morphological criterion of genetic impurity or heterozygosity in plants. A fuller publication is promised.—A. F. Blakeslee.

415. MAYER GMELIN, H. **Over Entbastaarden.** [On graft hybrids.] Culture 34: 205-216. 6 fig. 1922.—Graft hybrids were obtained of *Solanum Lycopersicum* with *S. nigrum* and with *S. Dulcamara*. No success was gained by reciprocally grafting *S. tuberosum* with *Physalis Francheti*, *Solanum Melongena*, *S. Lycopersicum*, *S. nigrum*, *Nicotiana glauca*, *Atropa Belladonna*, and *Datura Stramonium*. Periclinal and sectorial chimeras were obtained, the latter in the largest quantities. Indirectly, periclinal chimeras may be produced by sectorial chimeras. A suggestion is made of grafting more than 2 individuals, though the results may be smaller. If in the periclinal chimera the epidermis is produced by 1 component, the roots formed on cuttings will belong to the other component, since roots usually originate endogenously.—J. C. Th. Uphof.

416. RAWES, A. N. **Pollination in orchards (V).** Jour. Roy. Hort. Soc. 47: 8-14. 1922.—This paper reports work with apple varieties grown in plots in a glass house and is a continuation of work previously reported. Fifty varieties have been experimented with of which 8 are classed as self-fertile, 39 partly self-sterile, and 3 entirely self-sterile. Self-fertile varieties set fruit more freely when pollinated with pollen from other varieties. No instances of cross sterility have been discovered in apple varieties. The blooming periods of 10 varieties are

shown, and sufficient differences between early and late blooming varieties to interfere with cross pollination were found.—*J. K. Shaw.*

417. SHAMEL, A. D. Florida undertakes systematic citrus bud-selection work. California Citrogr. 7: 102, 127. 3 fig. 1922.—The Florida Agricultural Experiment Station has established a branch station primarily for work on "bud selection" and "stock selection" in citrus fruits, in cooperation with the U. S. Department of Agriculture. The author reports that the Alabama plantings of the Owari variety of "Satsuma orange" include "twelve or fifteen distinct strains."—*Howard B. Frost.*

418. SHAMEL, A. D. Relation of apple bud selection to citrus-fruit improvement. [Includes rev. of: DAVIS, M. B. The possibility of the transmission by asexual propagation of the high yielding ability of individual apple trees. Sci. Agric. 2: 120-124. 1921.] California Citrogr. 7: 112-113. 1922.—The reviewer states that he has found "much larger gains from propagation from superior parent citrus trees than those reported in the apple paper," and attributes this difference to selection from a larger number of trees in the citrus work. Citrus shows very distinct bud-variation strains within the commercial varieties.—*Howard B. Frost.*

419. SPRENGER, CARL. Iris-Züchtung und Iris-Verwendung. [Iris breeding and Iris improvement.] Gartenwelt 26: 270-271. 1922.—A general consideration of breeding and raising Iris as conducted by the author on the island of Corfu is presented. The following Iris hybrids are described: *Iris Jokaste* (*I. atropurpurea* × *I. susiana*), *I. Antigone* (*I. atropurpurea* × *I. Bismarckiana*), *I. Hippodamia* (*I. atropurpurea* × *I. susiana*), *I. Aerope* (*I. atropurpurea* × *I. susiana*), *I. Klytemnestra* (*I. atropurpurea* × *I. Saarii lurida*), *I. Iphigenia* (*I. atropurpurea* × *I. Saarii lurida*), *I. Electra* (*I. Saarii* × *I. susiana*), *I. Juno* (*I. Saarii lurida* × *I. iberica*), *I. Minerva* (*I. Saarii* × *I. iberica*), *I. Ceres* (*I. Saarii* × *I. Madonna?*), and *I. Latana* (*I. Saarii* × *I. iberica*).—*J. C. Th. Uphof.*

420. STOMPS, THEO. J. De Stoffelijke basis der erfelijkheid bij planten en dieren. [The material basis of heredity in plants and animals.] 270 p., 24 fig. Haarlem, 1922.—The writer gives a popular review of our present knowledge of the nucleus in relation to the phenomena of heredity. He considers mitosis as a kind of osmotic process. Size and difference in appearance between chromosomes of the same nucleus is most simply explained by supposing that the chromosomes are entirely independent organs with distinct external properties. An abnormal number of chromosomes is considered the cause of cancer.—*J. C. Th. Uphof.*

421. TOENNIEN, E. Über die Vererbung der Alkaptonurie des Menschen. [On the inheritance of alkaptonuria in human beings.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 26-30. 1922.—Alkaptonuria is a condition in man in which the amino acids phenylalanin and tyrosin are not completely destroyed, causing arthritis and deposition of pigment in the cartilages. They are also found in the urine, causing characteristic coloring and deposits. A review of the cases of alkaptonuria already reported showing inheritance of the disease is made and charts are given. Summary of these data shows that the number of unaffected individuals in relation to those affected is as 3:1. These cases are small in point of number. This condition is not restricted to one sex and can be transmitted by either parent. No cases in which both parents are affected are reported. In 1 case quoted from Umber, 1 affected male, with no affected sibs, mated in an out blood to a non-affected female, produced 4 affected and 4 non-affected offspring. This the author considers a *RR* × *DR* mating because of the proportions. His conclusion is that alkaptonuria rests upon a recessive character and is not in the X chromosome as it is not sex-linked. This agrees with the physiological knowledge that the condition exists because of the absence of a ferment.—*A. H. Estabrook.*

422. VALLEAU, W. D., and E. J. KINNEY. Strains of standup White Burley tobacco resistant to root-rot. Kentucky Agric. Exp. Sta. Circ. 28. 16 p., 6 fig. 1922.—Tobacco root-rot caused by *Thielavia basicola* is the most serious disease of tobacco in the Burley section of

Kentucky. A discussion of the nature of root-rot, its effect on cultural practices and methods of control are considered. Growing of resistant varieties is thought to be the best method of control. The so-called Burley variety of tobacco is shown to be made up of a large number of distinct strains which breed fairly true although the progeny of some plants show distinct segregation. Selections of "standup" types of Burley have been made which appear to be very resistant to root-rot and of the desired "standup" type and of high quality. These are being tested commercially. Selection is being continued.—*W. D. Valleau.*

423. Y., G. U. Statistical method. [Rev. of: JONES, D. C. A first course in statistics. ix + 286 p. G. Bell and Sons: London, 1921.] *Nature* 109: 473-474. 1922.

HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issue Entries 58, 134, 173, 174, 210, 285, 348, 373, 402, 404, 412, 416, 419, 672, 689, 690, 691, 692, 760, 831, 832, 888, 918)

FRUITS AND GENERAL HORTICULTURE

424. ANONYMOUS. Raspberries tried at Wisley. *Jour. Roy. Hort. Soc.* 47: 43-49. 1922.—Stocks representing 29 summer-fruited and 14 autumn-fruited varieties were tested and awards made by the Fruit and Vegetable Committee. Keys to the varieties and brief descriptions are given.—*J. K. Shaw.*

425. ANONYMOUS. Strawberries tried at Wisley 1920-21. *Jour. Roy. Hort. Soc.* 47: 50-55. 1922.—One hundred stocks representing 65 varieties of strawberries were tried and awards made. Owing to abnormal conditions no classification was attempted, but a table showing varietal characteristics and descriptions and notes of the several varieties are given.—*J. K. Shaw.*

426. ANONYMOUS. The Barham Court peaches. *Gard. Chron.* 70: 234. 1921.—These peaches were grown at Maidstone and exhibited at all important English exhibits a generation ago by Mr. Woodward, but now are rarely seen. The crop this season yielded about 17,000 fruits, the majority weighing 10-12 ounces. Mr. Woodward believes in young, vigorous trees and is constantly replanting during October and early November, using an abundance of wood ashes and top dressing. Duke of York is favored for early crops, and Hale's Early followed by Peregrin, Sea Eagle, and Nectarine Peach for late crops.—*P. L. Ricker.*

427. ARNOLD, W. S. The lemon. *Agric. Gaz. New South Wales* 33: 437-441. 1922.—In these practical cultural instructions particularly for the Kurrajong region, it is recommended that trees be fertilized by "soiling" (application of bush-land dirt) rather than by commercial fertilizers. It is suggested that the Australian native Kumquat, *Eremocitrus glauca*, be used as stock for grafting.—*L. R. Waldron.*

428. AUCHTER, E. C. Pruning and nitrogen studies in a devitalized peach orchard. *Proc. Amer. Soc. Hort. Sci.* 18: 178-193. 1921 [1922].—Devitalized peach trees 10 years old can be profitably rejuvenated by proper methods of soil management, spraying, worming, fertilizing, and pruning. Although good methods of soil management, worming, spraying, and applications of nitrate of soda have improved the general health of these trees, best results were not attained without some pruning. A moderately heavy pruning (cutting back into 3- or 4-year-old wood) gave best results. A moderately heavy pruning lowered the head of the tree noticeably, and in 2 years a new top was formed and vigorous growth stimulated through the lower parts of the tree. Trees in this condition should produce maximum crops for 6 or 8 years if properly managed. Although the partially pruned trees were stimulated so that

certain of the limbs will probably bear a fair crop, the growth on the dehorned limbs was so unsatisfactory that the gradual rebuilding of the tree was not attained. Provided each tree had enough main limbs to start with, so that a stub or two could be sacrificed without seriously impairing the shape, this method would, no doubt, be better than lightly pruning the tree and it might possibly equal the heavily pruned tree in yield over a 6- or 8-year average. The completely dehorned trees made a very dense, vigorous growth during both years, and were considerably dwarfed, and only a small number of fruit buds were formed on the long, over-vegetative shoots. This method was not so good as moderate pruning. With moderate or light pruning in the future, these trees will, no doubt, produce several profitable crops. Although light pruning produced a certain amount of stimulation in growth and fruit during the 2 years, it is very questionable whether the average production from trees so pruned will be enough in the next 6 years to justify use of the ground.—*W. E. Whitehouse.*

429. BALME, JUAN. **Un frutal japonesa de porvenir para la region subtropical de Mexico.** [A promising Japanese fruit for the subtropical region of Mexico.] *Rev. Agric. [Mexico]* 6: 516. 1921.—The author recommends the culture of the Japanese persimmon [*Diospyros Kaki*] in subtropical Mexico.—*John A. Stevenson.*

430. BARAKZAI, MAHOMED U. F. **Fruit culture as practised near Shikarpur, Sind.** Bombay Presidency Dept. Agric. Bull. 98. 14 p. 1920.—Shikarpur is on the western edge of the Sind Desert, India. The notes cover the propagation, irrigation, cultivation, flowering, yield, fruit preparation, pests, and local uses of the produce of the date (*Phoenix dactylifera*), pomegranate (*Punica Granatum*), crab apple (*Pyrus Malus*), guava (*Psidium Guajava*), and pharwan (*Grewia asiatica*).—*Robert L. Pendleton.*

431. BARTLETT, REG. G. **Better bananas. How to de-sucker to get them.** *Agric. Gaz. New South Wales* 33: 429-431. 2 fig. 1922.—Practical instructions are given.—*L. R. Waldron.*

432. BEATTIE, W. R. **The city home garden.** U. S. Dept. Agric. Farmers' Bull. 1044. 39 p., 16 fig. 1919.—This is a popular bulletin dealing with preparation of soil, tools, crops for the garden and their care. A table is appended giving the earliest and the latest safe dates for planting various vegetables in the open.—*C. G. Vinson.*

433. BECKETT, E. **Peaches and nectarines in the open.** *Gard. Chron.* 70: 139. Fig. 57. 1921.—The author gives notes on English cultural methods and conditions.—*P. L. Ricker.*

434. BIOLETTI, FREDERIC T. **Replacing missing vines.** *California Agric. Exp. Sta. Circ.* 249. 1922.—A loss of 27.8 pounds due to a missing muscat was accompanied by 5.6 pounds additional crop on the 2 neighboring vines, a compensation of about 20 per cent. For a missing Sultanina the compensation was 43 per cent. The filling of such gaps by the method of layering is recommended.—*A. R. C. Haas.*

435. BIOLETTI, FREDERIC T. **Vine pruning systems.** *California Agric. Exp. Sta. Circ.* 245. 4 p. 1922.—The systems best adapted to the conditions of grape growing in California are considered in 3 groups, head pruning, cane pruning, and cordon pruning; the advantages of each are explained.—*A. R. C. Haas.*

436. BLACKBURN, R. E. **Satsuma orange.** *Georgia State Coll. Agric. Circ.* 76. 4 p. 1918.—General directions are given for planting and handling this fruit in Georgia.—*T. H. McIlhatton.*

437. BRIERLEY, W. G. **Notes on the length of life of apple trees in Minnesota.** *Proc. Amer. Soc. Hort. Sci.* 18: 211-213. 1921 [1922].—The average apple tree in Minnesota commences bearing 6-8 years after planting, reaches its maximum production at about 20 years, then gradually fails. Apparently this is due mainly to climatic effects. Replies to a question-

naire sent to leading orchardists indicate that none of the common hardy varieties withstand Minnesota winters for 40 years. The length of life of these varieties is directly correlated with their hardiness.—*W. E. Whitehouse.*

438. BUNYARD, EDWARD A. **The winter study of fruit trees.** Jour. Roy. Hort. Soc. 47: 18-25. Pl. 3. 1922.—Since deciduous fruit trees are, for fully half a year, without leaves or flowers the woody parts have been examined for characters of assistance in identifying varieties. Moderately vigorous 1-year shoots from an exposed part of the tree are best. Characters considered are stoutness, degree of curving between the buds, internode length, color, hairiness, lenticels, and various peculiarities of both fruit- and leaf-buds. The form of adult trees is also of value. These characters in different varieties of apple, pear, cherry, and plum are discussed.—*J. K. Shaw.*

439. BURNS, W., and S. H. PRAYAG. **The book of the mango.** Bombay Dept. Agric. Bull. 103. 98 p., illus. 1920.—The authors' experiments on many phases of mango production and handling are described, as well as the results of other workers in India and in other mango-growing countries.—The treatment by chapters, is as follows: (1) The history of mangoes, their distribution through the world, suitable soils, climates, and altitudinal ranges; (2) propagation methods, including cuttings, layering, grafting, budding, and top-working; (3), planting, covering distances between trees, season, and care; (4) subsequent care, as manuring, irrigation, pruning, and inter-crops; (5) harvesting, packing, and marketing, including ripening, sale of crop on the trees, and export possibilities; (6) transport of trees, scions, and seeds, both for short and long distances and ocean shipments; (7) unsatisfactory plantations, discussing especially sterility and renovation of neglected groves; (8) time and methods of pollination; (9) pests and diseases,—insect, fungous, and others; (10) uses of the mango; (11) classification, proposing an artificial system based on fruit characters.—An appendix includes spray formulas and a descriptive list and illustrations of the fruits of 89 varieties of Bombay Presidency mangoes.—*Robert L. Pendleton.*

440. CHURCH, G. G., and E. M. CHASE. **Some changes in the composition of California avocados during growth.** U. S. Dept. Agric. Bull. 1073. 1922.—No satisfactory correlations were found between physical properties and maturity. The proportion of many of the constituents changes during development with marked increase in fat content. This takes place rapidly while the fruit is immature, much more slowly as it approaches maturity, accompanied by a decrease in sugar content. Fruits rich in fat contain at least 70 per cent on a water free basis at maturity. On storage of immature fruits there is an apparent increase in the proportion of fat and decrease in sugar content while mature fruits do not show this increase to the same extent. No standards of maturity are recommended.—*J. T. Buchholz.*

441. COLE, W. R. **Extension work in apple storage in Massachusetts.** Proc. Amer. Soc. Hort. Sci. 18: 130-135. 1921 [1922].—This report shows the present status of storage work among Massachusetts fruit growers. Common and air-cool storage on the farm, as practiced by a number of growers, means the utilization of existing cellars, or the construction of cellars for apple storage. The principles involved in this type of storage are discussed, and directions are given for utilizing old cellars.—*W. E. Whitehouse.*

442. CRANE, H. L. **Observations on the factors influencing the length of life of apple trees in West Virginia.** Proc. Amer. Soc. Hort. Sci. 18: 207-211. 1921 [1922].—The short life of apple trees in West Virginia is due primarily to shallow soils low in the elements of fertility; to the prevalence of diseases and insect pests; to climatic conditions, which seem to favor rapid development of trees and provide conditions in some cases almost ideal for diseases and insect pests; lastly to the varieties now grown, which come into bearing early and each year bear heavy crops, which exhausts the soil and weakens the trees.—*W. E. Whitehouse.*

443. CULLINAN, F. P. **Root development of the apple as affected by cultural practices.** Proc. Amer. Soc. Hort. Sci. 18: 197-203. 1921 [1922].—This paper contains observations on the

root development of Grimes apple trees after growing 8 seasons under sod, straw mulch, and tillage soil-management methods. The root systems of the trees under cultivation were quite symmetrical, spreading into all parts of the soil surrounding the trees. The main roots were found to a greater depth than those from the trees in the straw mulch or sod plots.—The trees under straw mulch had a shallow root system.—The trees in the sod made only a small growth but the root system as a whole did not come so near the surface as the roots under the straw mulch. A discussion of the factors influencing root development under these conditions is given.—*W. E. Whitehouse.*

444. DORSEY, M. J. Hardiness from the horticultural point of view. *Proc. Amer. Soc. Hort. Sci.* 18: 173-178. 1921 [1922].—This paper presents a study of the limitations of the variety as compared with the species from the hardiness standpoint. Investigation showed that with the species there are distinct regional types, individual variations, and that plants from the northern and southern part of the range of distribution may vary greatly in hardiness. The variety on the other hand may have some definite limitations as to plant characters or hardiness when compared with the species. Differences in the individual should be kept in mind in studying adaptation just as clearly as those in variety and species.—*W. E. Whitehouse.*

445. DURUZ, WILLIS P. Harvesting and handling apricots and plums for eastern shipment. *California Agric. Exp. Sta. Circ.* 239. 24 p. fig. 1-21. 1922.—Information and data obtained from successful growers of these fruits are given.—*A. R. C. Haas.*

446. DURUZ, WILLIS P. Harvesting and handling California peaches for eastern shipment. *California Agric. Exp. Sta. Circ.* 241. 21 p., fig 1-11. 1922.—The problems concerned with the harvesting and packing of California peaches, together with the costs involved, are considered in detail.—*A. R. C. Haas.*

447. DURUZ, WILLIS P. Harvesting and handling California pears for eastern shipment. *California Agric. Exp. Sta. Circ.* 240, 19 p. 1922.—Directions are given for harvesting and packing California pears for eastern shipment.—*A. R. C. Haas.*

448. FICHTER, G. Weiteres zur Unterlagen-Frage im Obstbau. [The question of stocks in pomology.] *Möllers Deutsch. Gärt. Zeitg.* 37: 173-175, 184-187. 7 fig. 1922.—In various types of stocks there is much difference in root development, which the author considers very important. Doucin I is considered the best, Doucin III is suitable for heavy growers such as Boskoop, Lebel, and Pontoise. Of Paradise stock the Yellow Metz is mentioned. Quince I as stock gives an upright growth to Pastor pear, Beurré Diel, and Blumenbach, whereas on Quince II they develop hanging branches. Under apple seedlings Höhenheimer, Frierscher Weinapfel, Rheinischer Bohnapfel are relatively constant and suitable as stock. Pears can be well grown on seedlings of Champagner Brat, Palmisch and Knaus.—*J. C. Th. Uphof.*

449. FREEMAN, W. G. The avocado in Trinidad and Tobago. *Bull. Dept. Agric. Trinidad and Tobago* 18: 113-124. 1919.—The writer describes the avocado (*Persea gratissima*) as to early history in the West Indies, common names, present distribution and cultivation. A table is given showing its comparative food value with that of other foods.—*Florence A. McCormick.*

450. GAJÓN, CARLOS. Como plantar los arboles frutales. [How to plant fruit trees.] *Rev. Agric. [Mexico]* 6: 391-395, 452-457. 30 fig. 1921.—A popular discussion is presented of varietal selection and propagation of the peach, fig, apple, nectarine, plum, pear, persimmon, and other fruits in Mexico.—*John A. Stevenson.*

451. GAJÓN, CARLOS. El mamey. [The mamey apple.] *Rev. Agric. [Mexico]* 6: 517-519. 4 fig. 1921.—The author discusses the planting, culture, pruning, and uses of *Lucuma mammosa*.—*John A. Stevenson.*

452. GARDNER, VICTOR RAY, FREDERICK C. BRADFORD, and H. D. HOOKER, JR. **Fundamentals of fruit production.** 686 p., 70 illus. McGraw-Hill Book Co.; New York, 1922.—This book is a text and reference work for college students but will also find ready use among progressive fruit growers. It "attempts to focus attention on the conditions which make the fruit plant profitable; practices are considered only as they affect these conditions, not as ends in themselves. . . . Plant physiology, soil chemistry, soil science and physics have been requisitioned freely and advisedly, in no case, however, without an indication of applicability to pomology." The following chapter heads indicate the subjects treated: The water requirements of fruit plants; the intake and utilization of water; orchard soil management methods and moisture conservation; soil moisture, its classification, movement, and influence on root distribution; the response of fruit plants to varying conditions of soil moisture and humidity; pathological conditions associated with excesses and deficiencies in moisture; plant nutrients and their absorption; individual elements; manufacture and utilization of carbohydrates; the initiation of the reproductive processes; surpluses and deficiencies; the application of nitrogen-carrying fertilizers; fertilizers, other than nitrogenous, in the orchard; growing season temperatures; winter killing and hardness; winter injury; winter injury to the roots; winter injury in relation to specific fruits; the occurrence of frosts; protection against frost; growing and fruiting habits; pruning, the amount or severity; pruning, the season; pruning with special reference to particular fruits; the structures and processes concerned in fruit setting; unfruitfulness associated with external factors; factors more directly concerned in the development of the fruit; fruit setting as an orchard problem; the reciprocal influences of stock and scion; the root systems of fruit plants; the geography of fruit growing; orchard locations and sites; orchard soils. A glossary is appended.—*J. H. Gourley.*

453. GIFFORD, F. R. **Converting the farm orchardist.** Proc. Amer. Soc. Hort. Sci. 18: 114-118. 1921 [1922].—This is a report of the peculiar problems encountered in extension work among orchardists in Wisconsin, where at least 75 per cent of the trees are in farm orchards, a large part of which are neglected. The method of carrying on extension work and the success attained by this method are discussed.—*W. E. Whitehouse.*

454. GIROLA, CARLOS D. **Cultivo de la yerba maté.** [Cultivation of "yerba maté."] Bol. Ministerio Agric. Nación [Argentina] 26: 129-142. 1 fig. 1921.—Paraguay tea or "yerba mate" (*Ilex paraguariensis* St. Hil.) has been much confused by some botanists with related species. Various varieties are recognized in Paraguay, the most important of which are *obtusifolia*, *acutifolia*, and *angustifolia*. Numerous other species of *Ilex* are used throughout South America for tea making. Brief notes covering botanical characteristics and the quality of the drink prepared from each are given.—*John A. Stevenson.*

455. GOKHALE, V. G. **Palm gul (sugar) manufacture in the Bombay Presidency (India).** Bombay Presidency Dept. Agric. Bull. 93. ii + 66 p., 11 pl. 1919.—The coconut palm (*Cocos nucifera*), date palm (*Phoenix sylvestris*), and palmira palm (*Bovassus flabeliformis*) are the more important palms of the Presidency.—In western India, toddy, a fermented drink is the only product of date palm juice. This bulletin is a study of the attempts made to introduce the Bengal method of making sugar from the fresh juice of date palm. Attention must be given to the use of lime, formalin, or the smoking out of the collecting pots to inhibit rapid fermentation; the boiling of the juice promptly after collecting; and the adoption of the more efficient Bengal methods of tapping, which will greatly decrease labor costs and increase the yield per tree. The output of fresh juice per tree per season (November-April) averages 17 imperial gallons, making 22 pounds of dark brown sugar. Unsuccessful experiments are reported on the use of a cheap acid to produce a lighter colored sugar. Illustrations and full details of tapping methods are given. There are numerous tables of analytical and sugar-making data.—There is not much probability that a sugar-making industry could use palms other than *Phoenix*. According to current prices palm-sugar making would be profitable only as a cottage or supplementary industry.—*Robert L. Pendleton.*

456. GOULD, H. P., and FRANK ANDREWS. **Peaches: production estimates and important commercial districts and varieties.** U. S. Dept. Agric. Bull. 806. 34 p., fig. 1-7. 1919.—The important commercial varieties and districts are given by states.—C. G. Vinson.

457. GOULD, H. P., and FRANK ANDREWS. **Pears: production estimates and important commercial districts and varieties.** U. S. Dept. Agric. Bull. 822. 16 p., fig. 1-3. 1920.—This publication gives the important commercial varieties and districts by states.—C. G. Vinson.

458. GOURLEY, J. H. **Text-book of pomology.** xv + 380 p., 8 pl., 40 fig. Macmillan Company: New York, 1922.—This volume is published in the Rural Text-Book Series, edited by L. H. Bailey. The purpose of the book "is to present the experimental and investigational bases of fruit-growing on the physiological side." The work represents an effort to provide a text suitable for college students who are already familiar with general orchard practice. Limited data in tabular form are offered as support for the conclusions throughout the work.—The following chapter headings indicate the scope of the book: Composition of fruits; buds of fruit-trees; differentiation of flower-buds; factors which influence fruit-bud formation; pruning; thinning of fruit; orchard soils; cultural methods in orchards; fertilizers and manures for the orchard; relation of climate to pomology; winter injury; pollination and the sterility problem; the origin and improvement of fruit; propagation and fruit-stocks; and storage of fruit.—J. H. Gourley.

459. HARRISON, G. H. **The most profitable varieties of peaches, cherries and apples for Maryland conditions.** Rept. Maryland Agric. Soc. 5: 295-302. 1920 [1921].

460. HILTS, R. W., and R. S. HOLLINGSHEAD. **A chemical study of the ripening and pickling of California olives.** U. S. Dept. Agric. Bull. 803. 24 p., pl. 1-5, fig. 1-9. 1920.—This bulletin gives the percentage of solids, oil, protein, and ash in the flesh and pits of fresh and ripe olives of various varieties. It was found that the percentage of oil in the fruit flesh is the best index to maturity for olives, both fresh and pickled.—Carl G. Vinson.

461. HOWARD, W. L. **The apricot in California.** California Agric. Exp. Sta. Circ. 238. 53 p., fig. 1-2. 1922.—A rather complete summary is given of the data regarding the cultivation, irrigation, pruning, thinning, spraying, disease and insect pests, frost protection, harvesting, and the costs involved in the growing of apricots in California.—A. R. C. Haas.

462. ITIÉ, GABRIEL. **Datos complementarios sobre el cultivo de la pifia.** [Additional data on pineapple culture.] Rev. Agric. [Mexico] 6: 645-649. 5 fig. 1922.—The author discusses the advantages and disadvantages of the different parts of the pineapple plant used for propagation, slips, crown slips, crowns, and suckers. Difficulties in pineapple cultivation experienced in Porto Rico, Hawaii, and Florida are reviewed.—John A. Stevenson.

463. LESLIE, W. R. **The Russian apple in America.** Proc. Amer. Soc. Hort. Sci. 18: 257-263. 1921 [1922].—This paper presents a history of the Russian apple in America, including introduction, present status, and influence on American horticulture.—W. E. Whitehouse.

464. LONGO, BIAGIO. **Su la vite selvatica della Maremma.** [On the wild vine of Maremma.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. 30²: 393-394. 1921.—Observations were made on the remarkable growth in Tuscan Maremma of the wild grape vine (*Vitis vinifera silvestris*). The possibilities of using this vine in agriculture, due to its apparent resistance to *Oidium*, *Peronospora*, and *Phylloxera*, are considered.—F. M. Blodgett.

465. LYNCH, W. D., C. C. McDONNELL, J. K. HAYWOOD, A. L. QUAINANCE, and M. B. WAITE. **Poisonous metals on sprayed fruits and vegetables.** U. S. Dept. Agric. Bull. 1027. 66 p. 1922.—When fruits and vegetables are sprayed in accordance with the schedules recommended by the Bureaus of Entomology and Plant Industry but little of the material used remains on the fruit or vegetable at harvest size.—Ira C. Swannan.

466. McHATTON, T. H., and N. D. PEACOCK. **Apple culture in Georgia.** Georgia State Coll. Agric. Bull. 239. 44 p., 22 fig. 1921.—The paper begins with a history of the apple in Georgia, and later gives a discussion of the best sites, locations, varieties, etc., for this fruit. It also contains a spray calendar and a discussion of common insects and diseases which attack the apple, ending with varietal adaptations and descriptions.—*T. H. McHatton.*

467. MACNAUGHTON, MALCOM. **The grape vine.** Gard. Chron. 71: 215, 233, 246, 262. 1922.—This is a lecture delivered to the Dundee Horticultural Association. Grapes are generally believed to have been introduced into England by the Romans, A. D. 10, and then trained to the tops of the highest trees; but little progress was made until they were grown under glass. The heating system, training, propagation, and care are described in detail.—*P. L. Ricker.*

468. MACOUN, W. T. **Observations on hardiness in the colder parts of Canada.** Proc. Amer. Soc. Hort. Sci. 18: 160-165. 1921 [1922].—This paper presents a brief history of the studies on hardiness in Canada, together with observations on the hardiness of stocks which are of great economic importance in Canada.—*W. E. Whitehouse.*

469. MEIER, F. C. **Wastage of fresh fruits and vegetables in transit and in storage.** Rept. Maryland Agric. Soc. 5: 310-318. 1920 [1921].—The several causes and remedial measures, with limited statistics on a few crops are given.—*A. Lee Schrader.*

470. MONTEALEGRE, MARIANO R. **La poda del cafeta.** [Pruning of coffee trees.] Bol. Camara Agric. Costa Rica 1: 113-128, 144-149. 1921.—A general discussion is presented of pruning in all its phases as related to coffee culture in Costa Rica.—*John A. Stevenson.*

471. OSKAMP, J. **The value of a more careful selection of plots and longer periods of observation in connection with pomological demonstrations.** Proc. Amer. Soc. Hort. Sci. 18: 113-114. 1921 [1922].

472. OVERHOLSER, E. L. **Cold storage as an aid to the marketing of plums.** California Agric. Exp. Sta. Bull. 344. 427-463. 1922.—The most desirable temperature for storage appears to be 32°F., there are, however, certain varieties of plums which keep well at 36°F. and which when properly picked and handled can be expected to hold up sufficiently well to be shipped by refrigerator boats through the Panama Canal to eastern coast markets. These varieties are: Kelsey, Wickson, Agen (French), Grand Duke, Satsuma, Yellow Egg, Pond, Climax, Tragedy, Robe de Sergeant, and Beauty; 4 other varieties (German, Imperial, Sultan, and Combination) may be suggested, although their keeping period at 36°F. is 7-10 days less. These last-named plums, however, will be marketable in eastern markets for only a relatively short period after removal from storage. Varieties of plums which appear to be unsuited for shipment east by boat, because of poor keeping qualities at 36°F., are Sugar, Columbia, Abundance, Botan, Burbank, Peach, Washington, and Clyman. The relative importance of the varieties of plums, as indicated by the amounts received upon the New York City markets during the season of 1920, is as follows: Kelsey, Pond (Gross, Hungarian), Wickson, Tragedy, Giant, Grand Duke, Diamond, Burbank, Climax, Beauty, American Blue, Clyman, Sugar, President, Gaviota, Santa Rosa, California Blue, Formosa, Purple Duane, German, Yellow Egg, and Apex. There is evidence that most of the shipping plums are frequently picked too green; 2-3 days longer upon the tree does not appreciably shorten their storage period and does result in larger size and better color and flavor.—*A. R. C. Haas.*

473. PARANJPE, H. P. **Cultivation of oranges and allied fruits in the Bombay Presidency (India).** Bombay Presidency Dept. Agric. Bull. 95. 23 p. 1919.—Horticultural practices in cultivating *Citrus* in western India are given.—The varieties grown belong to *C. decumana*, *C. Medica*, and *C. aurantium*. Of the last species there are commonly grown 3 loose-skinned and 1 tight-skinned varieties.—The particular climatic, soil, and cultural demands of the several varieties are given. Budding or otherwise propagating varieties on other than their own

stocks is desirable. Details of stocks and methods of propagation are described.—Root pruning, cultivation, withholding of irrigation water, manuring, and exposure of roots are some of the methods employed to control fruiting in order to produce a crop at the desired season. Suggestions are given as to possible reasons for failure. Diseases are numerous.—Analyses of orange garden soils and unsuitable irrigation water are appended.—*Robert L. Pendleton.*

474. PATVARDHAN, G. B. *Fruit culture in Palitana and Jamnagar (Kathiawar, India).* Bombay Presidency Dept. Agric. Bull. 101. 28 p., 3 pl. 1920.—In small plantings in Palitana Sweetwater, Muscatel, Black Hamburg, and Sultana vines are trained on wires or wooden supports. Detailed descriptions are given of the pruning system. The manuring practise is complicated, involving the annual removal of the soil from about the roots and replacing it with fresh soil mixed with lime, bone meal, and cotton seed cake. Wood ashes are used to ward off termite attacks. Irrigation, pruning, and spraying methods are fully described.—The citrus plantings are of Australian navels, Agra and Delhi oranges, sweet and sour limes, and Sicilian lemons. The cultural methods include green manuring with san (*Crotolaria juncea*), frequent irrigations, annual renewal of soil (mixed with fertilizers) about the roots, and careful pruning. Freshly slacked lime is spread under the trees to kill Mediterranean fruit flies, which are a very serious pest.—In a description of recent citrus plantings at Jamnagar, near the coast, good care is emphasized as essential. Effective windbreaks are necessary.—*Robert L. Pendleton.*

475. POPENOE, PAUL B. *Costa Rica, land of the banana.* Nation. Geog. Mag. 41: 201-220. 17 fig. 1922.—Notes are included on the growth and production of bananas and of coffee.—*W. M. Atwood.*

476. PRAYAG, S. H. *A preliminary note on the increase of grape yield.* Agric. Jour. India 17: 41-50. Pl. 4-5. 1922.—Experiments are described dealing with the most suitable method of training grapes in western India.—*A. Howard.*

477. PRETTYMAN, H. W., and H. S. VANDEVORT. *West Virginia demonstration community packing house, second report.* Proc. Amer. Soc. Hort. Sci. 18: 110-112. 1921 [1922].—This report of the second year's operation of a community packing house shows progress made, and the effect on development of packing houses in other communities. The packing house was in a position to determine for growers, by actual grading of a few small lots, whether their apples should be graded and barrelled or sent direct to the cannery.—*W. E. Whitehouse.*

478. PRIEGO, J. MANUEL. *Las variedades del olivo.* [Olive varieties.] Bol. Agric. Tech. Econ. [Spain] 14: 141-148. 1922.—The olive occurs widespread in Europe and Asia, growing under varying conditions, which has resulted in the origination of many varieties. The early Greeks and Egyptians recognized a number of varieties. Modern workers in France, Italy, and other countries have described a large number of distinct types. Some of the more important of these are briefly described.—*John A. Stevenson.*

479. RAWES, A. N., and S. FOX WILSON. *Pollination in orchards (VI).* Jour. Roy. Hort. Soc. 47: 15-17. 1922.—This paper deals with pollen-carrying agents. It was found that unlike hive bees wind is not an active agent in the distribution of fruit tree pollen. Several species of bumble bees were found to be active. House flies, midges, and small flies were also numerous.—*J. K. Shaw.*

480. REYNOLDS, PHILIP K. *Historia del platano.* [History of the banana.] Bol. Camara Agric. Costa Rica 1: 225-253. 1921.—An account is given of the banana industry as developed in Central America.—*John A. Stevenson.*

481. RIGOTARD, LAURENT. *La culture du noyer en France.* [The culture of walnuts in France.] Ann. Sci. Agron. Française et Etrangère 38: 1-9. 1921.—The following phases pertaining to the walnut are discussed: importance of export trade; decrease in production

in recent years; necessity of perfecting cultural practices; struggle against animal and vegetable parasites; scientific researches, theories, and practices; the rôle of a station in the study of the walnut.—A. B. Beaumont.

482. RUDOLF, W. **Experiments with common rock salt: (I) Effect on asparagus. (II) Eradication of weeds and cleaning of roadsides with salt. (III) After effects of salt.** *Soil Sci.* 12: 449-474. 1921.—Experiments with a top dressing of salt in addition to manure were made on 2- and 11-year asparagus plants. Common rock salt at the rate of 150, 300, and 500 pounds per acre was used. For the 2-year plants the salt increased the average total length of plants 21.1-38.7 per cent, the number of stems 2.9-26.8 per cent, and the average weight of stalks per plant the following year 5.3-17.1 per cent. Similar results were secured with the older plants. Experiments with salt for killing weeds and brush along roadsides showed that 8 tons per acre will kill all vegetation except asparagus. As a rule 5-6 tons are effective while 3-5 tons are not sufficient to kill deep-rooted plants. Salting should be done about mid-season just before a rain, and high, rank vegetation should be cut immediately before or after applications. The injurious action of 4-5 tons per acre are still evident the 2nd year while the effects of 3-3.5 tons are imperceptible. With 2-2.5 tons a fertilizing action seems to occur.—W. J. Robbins.

483. SET, G. B. **Some practical hints on the management of orchards in India.** *Agric. Jour. India* 16: 524-528. 1921.

484. SHAMEL, A. P., L. B. SCOTT, and C. S. POMEROY. **Frost protection in lemon orchards.** U. S. Depart. Agric. Bull. 821. 30 p., fig. 1-15. 1920.—Plats were selected containing 5-10 trees. A large percentage of fruit was saved in the winter of 1913 with adequate orchard heaters. Non-heated trees, injured by the freeze of 1913 and receiving good care, returned to normal production by January, 1914. The heating during the cold period of January, 1913, had practically no effect on the 2nd season's crop. The main effect of protecting trees during one season of low temperatures is in the saving of the crop for the current year. Lisbon trees bore a greater number of sound merchantable lemons after the freeze than Eureka, due to differences in habit of growth.—C. G. Vinson.

485. SHAMEL, A. D., L. B. SCOTT, C. S. POMEROY, and C. L. DYER. **Citrus fruit improvement, a study of bud variation in the Eureka lemon.** U. S. Dept. Agric. Bull. 813. 88 p., fig. 1-22. 1920.—Descriptions and performance records of 8 strains of the Eureka lemon are given.—C. G. Vinson.

486. SHAMEL, A. D., L. B. SCOTT, C. S. POMEROY, and L. S. DYER. **Citrus-fruit improvement, a study of bud variation in the Lisbon lemon.** U. S. Dept. Agric. Bull. 815. 70 p., fig. 1-14. 1920.—Performance records presented in this bulletin show that the Lisbon strain and the Open strain are the only ones of commercial importance. These strains of the Lisbon lemon are isolated through bud selection.—C. G. Vinson.

487. THOMAS, EDWARD E. **Studies on the irrigation of citrus groves.** California Agric. Exp. Sta. Bull. 341. 353-370. 1922.—Four points have been investigated in this work: (1) the amount of water in the soil at the upper and lower ends of long furrows; (2) the appearance and productiveness of trees growing at the upper and lower ends of long furrows; (3) the amount of available moisture in the soil when the water is applied at intervals of 30, 45, and 60 days; and (4) the effect of deep and shallow cultivation on the water-absorbing power of the soil.—(1) The results of this investigation indicate that irrigation furrows exceeding 250-300 feet in length are undesirable. When longer furrows are used the soil near the upper end inevitably receives an excess of water, becoming "water-logged." A portion of the soluble plant food will be leached and carried below the root zone by the water.—(2) Citrus trees growing on heavy soil may become stunted when excessively irrigated; the leaves turn more or less yellow and many of them fall prematurely. The yield of fruit is also greatly impaired and

in some instances the trees may become unprofitable. In many groves it would be advisable to install a greater number of distributing pipe lines in order to shorten the irrigation runs.—(3) In order to secure best results irrigation water should be applied at the time it is needed, as gauged by the moisture content of the soil; whenever this procedure is impracticable it should be applied at intervals best suited to the soil type, as determined by experience or definite experiments.—On heavy loam soils such as that under consideration, the soil moisture remained more uniform and the conditions for root development better, with a 60-day interval between irrigations, than with a 30-day interval.—(4) The water-absorbing power of heavy soil is influenced by the method of tillage. The soil should not be stirred while it is wet. Frequent shallow cultivation tends to pack the soil immediately below the cultivated area. The plow-sole thus formed retards the movement of water in the soil.—Good conditions for plant growth can be obtained by harrowing the soil lightly after it has become sufficiently dry near the surface to prevent puddling, then allowing it to remain undisturbed until it has dried out more deeply to permit deep and thorough cultivation.—A. R. C. Haas.

488. TROWBRIDGE, P. F. Report of the director, year ending June 30, 1921. North Dakota Agric. Exp. Sta. Bull. 159. 28-32, 2 fig. 1922.—Miscellaneous notes are given on varieties of vegetables, including onions, mangels, and potatoes; upon fruits, forest trees, and ornamentals.—L. R. Waldron.

489. WILLIAMS, R. O. Budding the avocado. Bull. Dept. Agric. Trinidad and Tobago 18: 125-128. 1919.—The writer brings forth additional evidence against the idea that the avocado is difficult to bud successfully. The method of budding, including the selection of buds and stocks, and the season for budding are given.—Florence A. McCormick.

490. WIMSHURST, C. R. Apple growing in Australasia and America: a comparison with English conditions. Jour. Ministry Agric. Great Britain 28: 1005-1010. 1922.

491. YOUNG, W. J. Preliminary report on the use of sodium silicate as a wound dressing. Proc. Amer. Soc. Hort. Sci. 18: 196-197. 1921 [1922].—The Muscadine grape if pruned after Jan. 1 bleeds excessively, and under certain conditions may bleed to death. The author found that wounds treated with sodium silicate solution remain dry and do not bleed.—W. E. Whitehouse.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

492. ANONYMOUS. Dahlias at Wisley 1921. Jour. Roy. Hort. Soc. 47: 56-73. 1922.—This report of trials of 240 stocks gives the awards of a joint committee of the Royal Horticultural Society Floral Committee and the National Dahlia Society. The varieties are classified, and brief descriptive notes are given.—J. K. Shaw.

493. ANONYMOUS. Mid season peas at Wisley 1921. Jour. Roy. Hort. Soc. 47: 81-89. 1922.—Awards, descriptions, and notes of 153 pea stocks are given, and the varieties classified.—J. K. Shaw.

494. ANONYMOUS. Sweet peas at Wisley 1921. Jour. Roy. Hort. Soc. 47: 74-80. 1922.—Sweet peas (113 stocks) were judged under ordinary garden cultivation instead of as produced for exhibition. Awards, descriptions, and notes are given in a classified list of varieties.—J. K. Shaw.

495. BOECK, AUGUST. Eine Sortenauslese empfehlenswerter Phlox decussata-Züchtungen. [A select list of improved varieties of *Phlox decussata*.] Möllers Deutsch. Gärt. Zeitg. 37: 202-203. 1922.—The writer describes 33 varieties or hybrids of *Phlox decussata*, and arranged them according to color.—J. C. Th. Uphof.

496. BROTHERSTON, R. P. **The pentstemon.** Gard. Chron. 70: 208. 1921.—This flower is of comparatively modern cultivation, some of the more common species having been introduced into England about 1825. Notes on some of the species are given with dates of introduction.—P. L. Ricker.

497. BROTHERSTON, R. P. **The sweet williams.** Gard. Chron. 70: 136. 1921.—The sweet william, first mentioned by Turner in 1573, was in general cultivation in English gardens by 1629, but little progress was made in improving it until the 18th century. Some early hybrids are mentioned and brief cultural notes given.—P. L. Ricker.

498. DOHRN, P. H. **Deutsche Edelcanina.** [German improved Canina stock.] Möllers Deutsch. Gärt. Zeitg. 37: 175-176. 3 fig. 1922.—Deegens, Senffs, and Kokulinsky types of *Rosa canina* are described as stocks for rose varieties and hybrids.—J. C. Th. Uphof.

499. DYKES, W. R. **Crocus species.** Gard. Chron. 71: 126. 1922.—Some early species and varieties for cultivation are noted.—P. L. Ricker.

500. DYKES, W. R. **The classification of garden irises.** Jour. Roy. Hort. Soc. 47: 2-7. 1922.—This classification deals only with the bearded irises grown in gardens and is based on trials of varieties begun at Wisley in 1915. It was found impossible to base the classification on wild species, therefore color, height, and season are the characters used. An outline of color classification with typical examples is given. A complete list will follow.—J. K. Shaw.

501. EHRENTHAUT, E. **Camellien-Kultur.** [Camellia culture.] Möllers Deutsch. Gärt. Zeitg. 37: 159-160. 1922.—Camellia varieties are propagated by cuttings or by grafting on *C. Chandleri elegans* and *Campbell*. The latter species especially is used for varieties which are difficult to grow from cuttings or which do not produce well-developed buds. Cuttings taken in July or November-December must have 3-5 leaves. They are put in propagating beds containing sandy heather soil at a temperature of 20-22°C. At irregular soil temperatures the cuttings produce large callous but no roots. When rooted they are put into small pots containing heather and lawn soil. The 3rd year they are planted in larger pots. During winter they are kept close under the glass in a light greenhouse which is free from frost.—J. C. Th. Uphof.

502. ELWES, H. J. **The Darrah collection of cacti at Manchester.** Gard. Chron. 70: 198-199. 1921.—A very large collection of succulent cacti, assembled by the late Charles Darrah, was presented by his widow to the corporation of Manchester in 1903. A range of houses, built in Alexandra Park to contain the collections, was opened to the public in December, 1906. A catalog of the original bequest lists 1,350 species and contains many interesting notes.—P. L. Ricker.

503. GROVE, A. **Lilies in 1921.** Gard. Chron. 71: 228-229. 1922.—This is a general consideration of meteorological conditions in relation to disease and various species in cultivation.—P. L. Ricker.

504. HALL, DANIEL. **The florists' tulip.** Gard. Chron. 71: 128, 140. 1922.—This is a lecture delivered at a recent meeting of the London School Gardening Association.—P. L. Ricker.

505. HASTINGS, G. T. [Rev. of: TRELEASE, WILLIAM. **Plant materials of decorative gardening. The woody plants.** xliii + 177 p. Urbana, Illinois, 1921. \$1.00] Torrey 22: 88. 1922.—This 2nd edition presents 4 keys to the trees, shrubs, undershrubs, and woody climbers found commonly in cultivation in the eastern U. S. A.; 7 genera are described, and 1,150 species mentioned. A glossary is attached.—J. C. Nelson.

506. HEAL, JOHN. Blue flowering climbers for the greenhouse. Gard. Chron. 71: 305-306. 1922.—Notes on plants for runner use, temperature requirements, and best method of handling are given.—*P. L. Ricker.*

507. HEAL, JOHN. *Dracaena*. Gard. Chron. 71: 154. Pl. 78. 1922.—Notes on introduction, best species and varieties, and methods of cultivation are given.—*P. L. Ricker.*

508. HENRY, A. *Populus generosa*. Gard. Chron. 70: 232. 1921.—Two trees at Kew 7 years old from seed are 36½ feet high with a girth of 21½ inches breast high. This vigorous hybrid was first introduced at Kew in March 1912 from a cross made by dusting pollen of the west American balsam poplar (*P. trichocarpa*) on pistillate flowers of a black poplar (*P. angulata*). It is well worth cultivating both as an ornamental and possibly as a timber tree; it demands freedom from shade and has an extensive root system.—*P. L. Ricker.*

509. HURST, C. C., and MABEL S. G. BREEZE. Notes on the origin of the moss-rose. Jour. Roy. Hort. Soc. 47: 26-42. 1922.—The moss rose, *Rosa muscosa*, of Miller differs from the cabbage rose, *R. centifolia*, in its multiplicity of glandular organs. Reviews of the histories of the old cabbage rose and of the moss rose are given. The former has been freely cultivated in Europe for more than 2000 years. The moss rose is traced back to about 1696 to the south of France and is considered to have arisen from the cabbage rose by bud mutation on 3 different occasions. The White Provence or Rose Unique and Rose de Meaux have also given origin to moss forms by bud mutations. It is not known whether the "moss" character is due to a single Mendelian factor but the evidence is in favor of its being a simple dominant. A list of 104 papers is appended.—*J. K. Shaw.*

510. KACHE, PAUL. *Primula malacoides* und ihre Hochzucht für den Winterflor. [Primula malacoides and its breeding for winter-flowering.] Möllers Deutsch. Gärt. Zeitg. 37: 197-199. 1 fig. 1922.—Berlin, a type of this species observed in the trial grounds of the Horticultural College in Dahlem, had larger and more beautifully shaped flowers which were self fertilized, the offspring closely resembling the parent.—*J. C. Th. Uphof.*

511. KREBS, JOS. Kultur und Anzucht der Gloxinien. [Growing Gloxinias.] Gartenwelt 26: 339. 1922.—Seed of Gloxinias is sown January-February in fine muck or sandy leaf soil with a temperature of 25°C. The sown seed is not covered with soil. Seedlings transplanted 2-3 times and kept at 25-30°C. are large enough to be transplanted into 12-cm. pots and will flower late in July. The soil should be composed of leaf mould, muck sand, rotted manure, and some horn meal. In very hot weather plants should be sprayed with water and shaded. For each tuber only 2-3 of the best shoots are retained.—*J. C. Th. Uphof.*

512. MAGOR, E. J. P. *Rhododendrons*. Gard. Chron. 71: 42-43. 1922.—It is stated that lime and not peat is necessary for the growth of Rhododendrons and that the latter is often fatal to them. The best varieties for cultivation are discussed.—*P. L. Ricker.*

513. MULFORD, F. L. Street trees. U. S. Dept. Agric. Bull. 816. 58 p., fig. 1-37. 1920.—An outline map of U. S. A. shows the regions within which essentially similar conditions for tree growth exist. Descriptions of trees and palms suitable for planting in the various districts are given.—*C. G. Vinson.*

514. PATEMAN, T. Winter flowering carnations. Gard. Chron. 71: 141. Fig. 69. 1922.—Notes are given on some of the best varieties arranged according to color.—*P. L. Ricker.*

515. PRIEGO, J. MANUEL. La variedad en arboricultura. [The variety in arboriculture.] Bol. Agric. Tech. Econ. [Spain] 14: 39-45. 1922.—The author discusses the origin of varieties, their importance in arboriculture, the fixing of new varieties, and the characters used to distinguish them.—*John A. Stevenson.*

516. PROSCHOWSKY, A. ROBERTSON. Palms of the Riviera. Gard. Chron. 70: 184-185. 1921.—A note is presented on the species of *Cocos* now referred to the genus *Blutia*.—P. L. Ricker.

517. PROSCHOWSKY, A. ROBERTSON. Palms of the Riviera. Gard. Chron. 71: 153. Pl. 77. 1922.—Notes on *Arecastrum romanzoffianum* are given.—P. L. Ricker.

518. SMITH, THOMAS. Raising alpine plants from seed. Gard. Chron. 71: 156. 1922.—A list of 36 genera taken from an English seed catalogue is given, with detailed methods of propagation.—P. L. Ricker.

519. THATCHER, A. E. Chinese climbers at Aldenham. Gard. Chron. 71: 270, 305. Pl. 144, 167. 1922.—Notes are given on *Actinidia*, *Celastrus*, *Clematis*, *Holboellia*, *Coculus*, *Drayea*, *Lonicera*, *Rubus*, *Sargentodoxa*, *Schizandra*, *Sinofranchetia*, and *Vitis*.—P. L. Ricker.

520. THATCHER, A. E. Chinese shrubs at Aldenham. Gard. Chron. 71: 114-115, 123, 137, 179, 199. Fig. 56, 67, 92, 102, 111. 1922.—Notes are presented on plants principally introduced to English gardening as a result of the 3rd Chinese expedition of E. H. Wilson.—P. L. Ricker.

VEGETABLE CULTURE

521. ANONYMOUS. Experiments in the cultivation of tomatoes. Exp. and Research Sta. Nursery and Market Garden Industries Development Soc. Ltd., Turner's Hill, Cheshunt Herts, Ann. Rept. 7: 8-13. 1921.—Mulches, base manures, and top dressings are discussed, with figures to show the effects of each on yield of tomatoes (*Lycopersicum esculentum* Mill.). Proper aeration also increased the yields.—W. H. Tisdale.

522. ANONYMOUS. The manurial experiments. Exp. and Research Sta. Nursery and Market Garden Industries Development Soc. Ltd., Turner's Hill, Cheshunt, Herts, Ann. Rept. 7: 8-13. 1921.—For Tomatoes (*Lycopersicum esculentum*) various combinations of artificials with and without dung and with and without some of the principle constituents are reported. The best yields were obtained with complete artificials minus nitrogen and minus dung. With Cucumbers (*Cucumis sativus*) the best results were obtained with complete artificials minus nitrogen. Artificials without nitrogen and dung also gave good results.—W. H. Tisdale.

523. AYRES, W. E. Vegetables and truck for home use. Mississippi Agric. Exp. Sta. Bull. 210. 16 p., 9 fig. 1921.—Variety tests under Mississippi Delta conditions are reported for turnips, tomatoes, Irish potatoes, sweet potatoes, beets, bush beans, sweet corn, cucumbers, squash, watermelons, and cantaloupes. Results with different methods of training tomatoes and suggestions for growing spinach, collards, lettuce, cabbage, okra, pepper, radishes, lima beans, garden peas, onions, strawberries, and blackberries are also given.—J. Fred O'Kelly.

524. BOSE, S. R. Possibility of mushroom industry by cultivation. Agric. Jour. India 16: 643-647. 1921.

525. BROWN, H. D. Canning-factory tomatoes. Indiana (Purdue) Agric. Exp. Sta. Bull. 259. 20 p., 7 fig. and frontispiece. 1922.—Indiana is one of the 4 leading states in canning-tomato production. The yield of wheat following tomatoes is greater than the yield following wheat, corn, or even clover. Methods of growing the plants and transplanting are described. Yield data for different fertilizers are given; 500-1,000 pounds per acre of a 2-12-6 fertilizer is recommended. Acid phosphate increases the earliness of the crop.—Max W. Gardner.

526. DOMINGUEZ, IGNACIO. *La alcachofa*. [The globe artichoke.] Rev. Agric. [Mexico] 7: 73-76. 4 fig. 1922.—The author discusses the culture, harvesting, and uses of the globe artichoke under Mexican conditions.—*John A. Stevenson*.

527. ESCOBAR, ROMULO. *El esparrago*. [Asparagus.] Rev. Agric. [Mexico] 7: 15-19. 3 fig. 1922.—Popular.—*John A. Stevenson*.

528. FIROR, GEORGE H., and LOIS P. DOWDLE. *Pimento growing*. Georgia State Coll. Agric. Bull. 234. 16 p., 5 fig. 1921.—Pimento, a variety of pepper (*Capsicum annum* L.), is popular because of its mild flavor, thick meat, and smooth skin. Seed should be started in hot beds and plants set into a friable, fertile loam in rows 3 feet apart and 14-18 inches in the row. The latter part of the bulletin contains instructions for canning and cooking pimentos.—*T. H. McHatton*.

529. GAY, M. C. *Harvesting, storing and marketing sweet potatoes*. Georgia State Coll. Agric. Bull. 244. 12 p., 1 fig. 1921.—A general discussion is given of the proper methods of harvesting and handling commercially the sweet potato (*Ipomoea batatas* L.).—*T. H. McHatton*.

530. MÜLLERS, L. *Gemüsesamenbau*. [Vegetable seed growing.] Gartenwelt 26: 300-302. 12 fig. 1922.—Suggestions for growing seed of white and red cabbage and cauliflower are given.—*J. C. Th. Uphof*.

531. OROZCO, ENRIQUE. *El cultivo de hongos en la Sierra de Puebla*. [Mushroom cultivation in the Sierra Puebla.] Rev. Agric. [Mexico] 6: 326-331. 7 fig. 1921.—A popular article on mushroom growing, in which *Clavaria tlahuicole* is mentioned, but not described, as a new species.—*John A. Stevenson*.

532. SANDO, CHARLES E. *The process of ripening in the tomato, considered especially from the commercial standpoint*. U. S. Dept. Agric. Bull. 859. 38 p., pl. 1-4. 1920.—This publication gives analyses of tomatoes of several degrees of maturity and of tomatoes ripened artificially under various conditions of vegetation. Throughout the ripening period there was found an increase in moisture, acids, and sugars, and a decrease in solids, total nitrogen, starch, pentosans, crude fiber, and ash. Lack of ventilation during ripening increased the acid content approximately 138 per cent. The flavor of tomatoes ripened without ventilation was very inferior.—*C. G. Vinson*.

533. STUCKEY, H. P. *Further studies in fertilizing and storing sweet potatoes*. Georgia State Exp. Sta. Bull. 134. 11 p. 1919.—This bulletin reports work from 1914 to 1919, following the report of work from 1908 to 1913 in bulletin 107. Six plots were used in the fertilizer work (1) 24 tons of stable manure annually; (2) 2,100 pounds of 16 per cent acid phosphate; (3) 900 pounds of sulphate of potash; (4) 1,500 pounds of sodium nitrate; (5) 1,800 pounds of a complete fertilizer; (6) check. The soil was a Cecil clay loam. After 12 years the complete fertilizer plot led all others, with the stable manure plot next; but the yields obtained in excess of those of the check did not pay for the fertilizer. The nitrogeous plots yielded roots (*Ipomoea batatis*) of a lighter color and poorer flavor; the best quality products were obtained from the check and acid phosphate plots. The check plot produced the best keeping roots, and those from the grey land kept better than those from the red. In storage it was ascertained that potatoes lose an average of 16.6 per cent in weight from November to March; 3.73 per cent is the loss in water and the remainder is presumed to be due to the breaking down of carbohydrates and formation of CO₂.—*T. H. McHatton*.

534. WAGNER, F. *Der Hopfenbrau in Bayern*. [Hop culture in Bavaria.] Illustr. Landw. Zeitg. 42: 197-198. 1922.—A history and brief description of the hop industry of Bavaria is sketched.—*John W. Roberts*.

HORTICULTURAL PRODUCTS

535. GREGER, JUSTIN. Über Traubenholunder-Marmelade. [Elderberry marmalade.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 383-384. 1921.—Products of *Sambucus nigra* and *S. racemosa* are compared.—*E. E. Stanford*.

536. KRUG, O., und G. F. FIESELDMANN. Die 1921-er Weinernte in der Pfalz. [Vintage of 1921 in the Palatinate.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 384-389. 1921.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 183, 197, 215, 227, 228, 246, 439, 542, 647, 673, 680, 761, 777, 828, 902, 914, 925)

537. DENHAM, HUMPHREY JOHN. The structure of the cotton hair and its botanical aspects. Jour. Textile Inst. 13: 99-112. 1 pl. 1922.—The structure of the cotton hair is described in detail as to general conformation; primary wall; secondary wall; central canal and contents; pits, spiral markings and convolutions, and various abnormalities. The hair is a typical plant hair except that unlike other epidermal cells it has pits in its wall. Various explanations are suggested for the spiral markings and striations, these evidently having some connection with the spiral path of the nucleus and cytoplasm. The function of the cotton hair is unknown but the author suggests that it may afford an outlet for the elimination of excess polysaccharide material at a time when the needs of the plant are chiefly protein for the developing seeds.—*E. W. Sinnott*.

538. VUILLEMIN, PAUL. L'inflorescence. [The inflorescence.] Bull. Soc. Sci. Nancy IV, 1: 57-67. 1921.—Popular explanation of forms of inflorescence in phanerogams, with tabular recapitulation, is presented.—*A. Chase*.

539. WERTH, E. Zur experimentellen Erzeugung eingeschlechtiger Maispflanzen und zur Frage: Wo entwickeln sich gemischte (androgyn) Blütenstände am Mais? [On the experimental production of unisexual maize plants and the question: Where are hermaphrodite inflorescences developed in maize?] Ber. Deutsch. Bot. Ges. 40: 69-77. Fig. 1-2. 1922.—Maize plants were grown in crowded conditions in 20-22 cm. pots. The resulting plants were divided into 11 groups based on the degree of development of pistillate and staminate inflorescences. The more starved showed an increased tendency to form pistillate inflorescences. The 1st of the 11 groups contained normal plants; the 11th, sterile stalks with deformed essential organs; and the other groups showed variations between these 2 extreme conditions. However, no plant with only pure staminate flowers was observed. The plants ranged from 2.5 to 75 cm. in height. Experimental mutilation failed to increase the number of suckers. The percentage of hermaphrodite inflorescences on both the main stalk and the suckers was changed by selection but much more in the case of the suckers. There seemed to be a relation between size of the sucker and kind of inflorescence. The suckers with terminal staminate inflorescence were almost as fully developed as the primary stalk. The presence of hermaphrodite terminal flowers reduced the length growth, as did the presence of pistillate terminal inflorescences. These findings do not accord with previous reports of Goebel in the fir. The terminal part of a plant receives more nourishment than the lower portion, hence in maize the terminal inflorescence is normally staminate and the less well nourished lateral inflorescence develops as pistillate.—*J. L. Collins*.

540. ZIMMERMANN, A. Zur physiologischen Anatomie der Cucurbitaceen. [On the physiological anatomy of the Cucurbitaceae.] Ber. Deutsch. Bot. Ges. 40: 2-8. 1922.—This paper is based on a comparative study of the anatomy of a large number of representatives

of the family occurring in German East Africa (Amani). It includes a large number of observations relative to stomata; trichomes; number, location, course, and character of vascular bundles; occurrence of sieve tubes outside the bundles; abnormalities in the secondary thickening of the stem; differences in sun and shade leaves; presence of cystoliths, and power of the cells of the ground tissue of the stem to accumulate methylene blue and eosin from solutions of these pigments.—*Richard Holman.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*
L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 243, 266, 776, 810, 833, 835)

541. BORGE, O. Die Algenflora des Tåkernsees. [The algal flora of the Takern Lake.] Sjön Tåkerns Fauna och Flora Vol. 4. K. Svenska Vetenskapsakademien. 48 p. 40 fig. 1921.—A systematic account together with descriptions and notes on the occurrence of some 300 species and varieties of algae is given. About a third belong to the Desmidiaceae. The following are described as new: *Anabaena subcylindrica*, *Cosmarium Printzii*, *C. subturpinii*, *C. praecisum*, *C. geometricum* West var. *suecicum*, *Staurastrum tetracerum* (Kütz.) Ralfs. var. *tortum* (Teiling) n. comb., *S. papillosum* Kirchn. var. *contiguum*.—*L. H. Tiffany.*

542. CHEMIN, E. Sur le parasitisme de *Sphacelaria bipinnata* Sauvageau. [On parasitism of *Sphacelaria bipinnata*.] Compt. Rend. Acad. Sci. Paris 174: 244-247. Figs. 1-2. 1922.—It is found that *S. bipinnata* cannot be considered a true parasite, as it requires only support and receives no nourishment from its host. The tissues of *Halidrys siliquosa* is figured and described, both before and after the attached plants of *Sphacelaria* have been removed. Complete regeneration of tissue has in the meantime been accomplished.—*C. H. Farr.*

543. CHURCH, A. H. The somatic organization of the Phaeophyceae; an introduction to the theory of the plant-soma. Bot. Mem. [Oxford] 10. 110 p. 1920.—The Phaeophyceae, though relatively few in number of genera (130) and species (1,000), as at present recorded, show a range of somatic and reproductive specialization beyond that of any other empirical plant series, and are of outstanding interest in that they illustrate the evolution of massive parenchymatous growth-forms as the inevitable response of autotrophic life to the physical factors of the sea. The working hypothesis put forward is that the soma of land-vegetation has not been evolved independently, in response to the conditions of sub-aerial environment, but that its fundamental features have been inherited and adapted from a former submerged phase; and that the evolutionary progress of the plant body can be traced in the evolution of the plant soma within this dominant group of marine vegetation. An attempt is thus made to account phyletically for the morphological distinctions in the land plant. The Benthic Phase of plant-life falls into 3 main epochs: (1) The rise of the filamentous soma in deeper water from the first sessile encysted autotrophic flagellate; (2) the rise of algal growth nearer the surface in shallow and well-illuminated water, with shock of wave-action, culminating in massive growth forms of submarine forest vegetation; (3) elaboration of reef-pool conditions as the first land-masses break above the surface. The plant soma of the land is but the seaweed soma adapted and enlarged for its new conditions; the general features of habit still traced in the forest tree were laid down, once for all, in the first benthic filament of the rising sea-bottom.—*Edith Philip Smith.*

544. DICK, J. Beiträge zur Kenntnis der Desmidiaceen-Flora von Südbayern. [Contributions to our knowledge of the desmid flora of South Bavaria.] Krypt. Forsch. Bayer. Bot. Ges. München 4: 230-262. Pl. 11-17. 1919.—The report here given is based on explorations made during the years 1912-1916. The region studied is situated south of Munich, and the

author gives a detailed account of the various localities visited. He lists the desmids, 254 in number, which he has detected and represents many of them on the accompanying plates. Under each species cell-measurements and full data regarding localities are given, and these are often supplemented by descriptive or critical remarks. Although no novelties are formally proposed under new names, a number of aberrant forms are mentioned and their distinctive features indicated.—A. W. Evans.

545. KAISER, PAUL E. *Beiträge zur Kenntnis der Algenflora von Traunstein und dem Chiemgau.* [Contributions to the algal flora of Traunstein and Chiem Lake district.] Krypt. Forsch. Bayer. Bot. Ges. München 3: 130-148. 20 fig. 1918.—The present paper represents the 4th of a series devoted to the algal flora of southeastern Bavaria, the earlier numbers having appeared prior to 1918. The species, varieties, and forms enumerated number 131 and are classified as follows: Cyanophyceae (14), Flagellatae and Dinoflagellatae (5), Zygomyceteae (37), Conjugatae (60), and Chlorophyceae (16). The only new species proposed is *Spirulina vaginata*, but 3 new varieties or forms are described among the diatoms (Zygomyceteae). In addition to these, 38 algae are reported for the first time from Bavaria. Full data regarding stations are given throughout, and many of the forms are accompanied by critical or descriptive notes. The majority of the figures illustrate desmids.—A. W. Evans.

546. KAISER, PAUL E. *Desmidiaceen des Berchtesgadener Landes.* [Desmids of the Berchtesgaden region.] Krypt. Forsch. Bayer. Bot. Ges. München 4: 216-230. 34 fig. 1919.—The present report on the desmids of southeastern Bavaria is based almost entirely on collections made by Von Schoenau. The species, varieties, and forms enumerated number 154 and represent 17 genera; of these *Cosmarium* includes 65 species (and varieties), *Staurostrum* 26, *Euastrum* 14, *Closterium* 13, and the others less than 10 each. Each species is accompanied by cell-measurements, data regarding stations, references to published figures, and (in many cases) descriptive or critical notes. No new species are described but 4 new varieties and forms are proposed. The figures illustrate specimens of unusual interest.—A. W. Evans.

547. MAYER, ANTON. *Bacillariales der Umgegend von Ortenburg (Niederbayern).* [Diatoms from the vicinity of Ortenburg (Lower Bavaria).] Krypt. Forsch. Bayer. Bot. Ges. München 3: 122-148. Pl. 3-4. 1918.—The author gives a report based on his own collections of April, 1917. The species detected number 102 and represent 27 genera. *Nitzschia palea* var. *romana* Grunow is raised to specific rank under the name *N. romana* (Grunow) A. Mayer, and 8 other species or varieties are recorded for the first time from Bavaria. Many of the species are accompanied by descriptive or critical remarks, and forms of unusual interest are figured.—A. W. Evans.

548. MAYER, ANTON. *Bacillariales von Reichenhall und Umgebung.* [Diatoms of Reichenhall and vicinity.] Krypt. Forsch. Bayer. Bot. Ges. München 4: 191-215. Pl. 5-10. 1919.—The present report is based on a series of collections made by Von Schoenau. The species listed number 201 and represent 36 genera. Many of the species are accompanied by descriptive or critical remarks, and most of the more interesting specimens are figured. In certain cases distinct varieties or forms are enumerated. Several varieties and the following species are proposed as new: *Achnanthes conspicua*, *Cocconeis thumensis*, *Fragilaria gracilima*, *Navicula dimidiata*, *N. graciloides*, *N. involuta*, *N. lacta*, *Neidium tenellum*, *Surirella thumensis*, and *Synedra delicatula*.—A. W. Evans.

549. MAYER, ANTON. *Die bayerischen Eunotien.* [The Bavarian species of Eunotia.] Krypt. Forsch. Bayer. Bot. Ges. München 3: 95-121. Pl. 1-2, 3 fig. 1918.—The diatom genus *Eunotia*, according to the present report, is represented in Bavaria by 23 species, under several of which distinct varieties or forms are recognized. For the whole of Germany only 27 species have been definitely recorded. After an account of the generic characters and a key for the determination of the species, the latter are fully and critically described, with citations of the literature and definite data regarding Bavarian stations. The various species, varieties, and forms are figured.—A. W. Evans.

550. MERRIMAN, MABEL L. A new species of *Spirogyra* with unusual arrangement of the chromatophores. Amer. Jour. Bot. 9: 283-284. 3 fig. 1922.—A new species, *S. rectispira*, is described from New York City. It is closely related to *S. crassa*, from which it differs in its smaller zygospores and in the parallel arrangement of the chromatophores in vegetative cells of conjugating threads.—E. W. Sinnott.

551. PRINTZ, HENRIK. Subaerial algae from South Africa. Det Kgl. Norske Videnskabers Selskabs Skrifter 1921: 1-41. 14 pl. 1921.—An examination of 403 samples of subaerial algae collected in the environs of Durban and of Saldanha Bay, Africa, revealed 22 species. The following are described as new: *Protococcus consociatus*, *P. verrucosus*, *Chlorococcum vitiosum*, *Phaseolaria obliqua* nov. gen. et sp., *Myrmecia globosa* nov. gen. et sp., *Acanthococcus granulatus* Reinsch var. *aerophilus*, *Pleurastrum constipatum*, *Physolinum monile* (De Wildem.) nov. gen. et comb., *Trentepohlia lagenifera* (Hildebrandt) Wille var. *africana*, *Atractella affixa* nov. gen. et sp., *Myxosarcina concinna* nov. gen. et sp. The last two are Myxophyceae, the others Chlorophyceae.—L. H. Tiffany.

552. PUYMALY, A. DE. Reproduction des *Vaucheria* par zoospores amiboïdes. [Reproduction of *Vaucheria* by amoeboid zoospores.] Compt. Rend. Acad. Sci. Paris 174: 824-827. 1922.—A description of the formation and dispersal of these spores is given for both *V. geminata* and *V. hamata*.—C. H. Farr.

553. SCHAFFNER, J. H. The classification of plants. XII. Ohio Jour. Sci. 22: 129-139. 1922.—This paper completes a series dealing with the classification of plants. Synopses of the several algal phyla and a key to the orders of Algae are given. A general table of the classification of the plant kingdom on a phyletic basis is also included.—H. D. Hooker, Jr.

554. SHAW, WALTER R. *Janetosphaera*, a new genus, and two new species of *Volvox*. Philippine Jour. Sci. 20: 477-508. Pl. 1-5, fig. 1-5. 1922.—Under the name *Janetosphaera aurea*, the species that has long been known as *Volvox aureus* is given the status of a monotypic genus mainly on account of the characters of the cell membranes that were brought out by Meyer and confirmed by Janet. The author points out, as others have done, that forms have been described under the name of this species that do not belong there. A transcript of an European description of the species is supplemented by data derived from Californian material. Two new species of *Volvox* are described from the Philippines: *V. Merrilli* and *V. Barberi*. The former resembles *V. globator* of Europe and *V. perglobator* of North America, and the latter resembles *V. Rousseleti* of Africa. Both asexual and sexual phases of the new species are described. Descriptions of the 5 species retained in *Volvox* are given to facilitate comparison. Distinguishing characters of these species are presented in a key and a table.—E. D. Merrill.

555. SHAW, WALTER R. *Merrillosphaera*, a new genus of the *Volvocaceae*. Philippine Jour. Sci. 21: 87-129. Pl. 1-8. 1922.—Under the name *Merrillosphaera Carteri* the species that has been known as *Volvox Carteri* is redescribed in accordance with the characters found in very abundant material, including all phases of the life history, found at Manila. It is made the type of a genus distinguishable from *Volvox* by the absence of protoplasmic connections between the cells, by differentiation of the asexual reproductive cells in early stages of the embryos, and by the great size attained by them before division. The species was originally described from Bombay. A North American form (*Volvox Weismannia*) is considered only a variety of *M. Carteri*. An African species (*V. africanus*) and an European species (*V. tertius*) are embraced in the new genus, the former having been found also at Manila. Some European material included by Klein in *Volvox aureus* is made tentatively the basis of the species *Merrillosphaera Migulæ*.—E. D. Merrill.

556. STRØM, KAARE MÜNSTER. Freshwater algae from Caucasus and Turkestan. Nyt Mag. Naturvidenskab. 57: 1-14. Pl. 2, fig. 1-16. 1919.—A systematic account is presented

of 71 species of algae identified from collections made in Caucasus and Turkestan. The following are described as new varieties: *Cosmarium granatum* Bréb. var. *depressum*, *C. subtumidum* Nordst. var. *minor*, *C. impressulum* Elfv. var. *punctatum*.—L. H. Tiffany.

557. STRØM, KAARE MÜNSTER. Some algae from hot springs in Spitzbergen. Bot. Notiser 1921: 17–21. 1921.—A list is given of algae collected in the hot springs, Troldkilderne and Jotunkilderne, in the vicinity of Bock Bay, the temperature varying from 20–25°C.—L. H. Tiffany.

558. STRØM, KAARE MÜNSTER. The phytoplankton of some Norwegian lakes. Viden-skapsselskapets Skrifter I Mat. Naturv. Kl. 4: 1–51. 3 pl., 23 fig. 1921.—A contribution to the freshwater plankton of Norway, including an account of the plankton of the lakes investigated and a systematic list of the species and their frequency in the lakes. Of the 174 species and varieties observed 111 are Chlorophyceae, 19 Myxophyceae, 26 Diatomeae, 8 Flagellatae, 8 Peridineae, 1 Phaeophyceae. Distribution percentage in the plankton is apportioned: 49 per cent Desmidiaceae, 11 per cent Myxophyceae, 17 per cent Diatomeae, other Algae 26 per cent.—L. H. Tiffany.

559. SUESSENGUTH, KARL. Beitrag zur Kenntnis der Algenflora Südbayerns. [A contribution to our knowledge of the algal flora of South Bavaria.] Krypt. Forsch. Bayer. Bot. Ges. München 5: 362–367. 1920.—The author gives a list of 124 algae from various parts of South Bavaria, each species being accompanied by data regarding localities and, in a few cases, by descriptive notes. The species are arranged according to the following groups: Schizophyceae (7), Protomastiginae (14), Chrysomonadinae (9), Cryptomonadinae (3), Eugleninae (18), Dinoflagellatae (6), Volvocales (6), Tetrastorales (5), Protococcales (24), Ulotrichales (17), Microsporales (2), Zygnemales (9), and Heterochloridales (4). No new species are described.—A. W. Evans.

560. TAYLOR, WM. RANDOLPH. Notes on some algae from British Columbia. Rhodora 24: 101–111. 1 fig. 1922.—An annotated list is presented of the species collected in the Selkirk and Eagle Pass Mountains, with critical comments. *Rhizoclonium selkirkii* is a new species.—M. L. Fernald.

561. ZIMMERMAN, WALTER. Zur Entwicklungsgeschichte und Zytologie von Volvox. [The developmental history and cytology of Volvox.] Diss. Freiburg, 38 p. 1921.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 241, 250, 251, 256, 260, 263, 265, 266, 553)

562. ANONYMOUS. Hepatics. Moss Exchange Club Ann. Rept. [Arbroath] 26: 279–282. 1921.—Of the 53 species listed all came from the British Isles except 3,—1 from California, 1 from South America, and 1 from West Africa. Critical notes by D. A. J[ONES], H. H. K[NIGHT], W. E. N[ICHOLSON], and W. H. P[EARSON] elucidate some of the specimens distributed.—A. W. Evans.

563. ANONYMOUS. Hepatics. Moss Exchange Club Ann. Rept. [Arbroath] 27: 295–297. 1922.—The species listed number 51. The 8 exotic specimens came from South America and Tasmania, while the remaining specimens were all collected in the British Isles. Short critical notes by D. A. J[ONES], H. H. K[NIGHT], and W. H. P[EARSON] are included in the report.—A. W. Evans.

564. ANONYMOUS. Hepatics. Moss Exchange Club, Sec. II Rept. [Barmouth] 1920: 19–25. 1921.—Of the 93 species of hepatics distributed during 1920 and here listed, 12 came

from the Continent, 1 from Africa, and the others from the British Isles. D. A. J[ONES] and W. H. P[EARSON] have contributed a few critical notes.—A. W. Evans.

565. ANONYMOUS. Mosses. Moss Exchange Club, Sec. II Rept. [Barmouth] 1920: 6-18. 1921.—The report lists 145 species of mosses distributed during 1920. Most of the specimens came from the British Isles but 14 were collected on the Continent and 1 in Canada. Occasional critical notes by D. A. J[ONES], P. G. M. R[HODES], G. B. S[AVERY], W. R. S[HERRIN], and J. A. W[HELDON] are included.—A. W. Evans.

566. ANONYMOUS. *Sphagna*. Moss Exchange Club Ann. Rept. [Arbroath] 26: 271-273. 1921.—The specimens of *Sphagnum* distributed by the Club during 1920 are listed under 27 species. All the material was collected in the British Isles.—A. W. Evans.

567. ANONYMOUS. *Sphagna*. Moss Exchange Club Ann. Rept. [Arbroath] 27: 288-291. 1922.—The specimens of *Sphagnum* distributed by the Club are listed under 31 species, most of which are represented by several distinct varieties and forms. With the exception of 1 specimen from France and 3 from New Zealand the material was collected in the British Isles. A few critical notes are supplied by J. A. W[HELDON] and a new variety of *S. trichophyllum* Warnst., based on a New Zealand specimen, is provisionally proposed.—A. W. Evans.

568. ANONYMOUS. True mosses. Moss Exchange Club Ann. Rept. [Arbroath] 26: 273-279. 1921.—The species listed number 91. With the exception of 10 species from the Continent and 3 from New Zealand the list was based on material from the British Isles. Critical notes are supplied by H. N. D[IXON], W. E. N[ICHOLSON], P. G. M. R[HODES], W. G. T[RAVIS], and J. A. W[HELDON].—A. W. Evans.

569. ANONYMOUS. True mosses. Moss Exchange Club Ann. Rept. [Arbroath] 27: 291-294. 1922.—Of the 73 species listed 6 came from Switzerland, 4 from other parts of continental Europe, 1 each from California, New Zealand, and Tasmania, and the others from the British Isles. Critical notes accompanying certain specimens are by H. N. D[IXON], W. E. N[ICHOLSON], and P. G. M. R[HODES].—A. W. Evans.

570. AMANN, J. L'indice cellulaire des Fissidens européens du groupe "crassipes." [The cellular index of the European species of Fissidens belonging to the "crassipes" group.] Rev. Bryologique 48: 65-69. 1921.—The author applies his method of measuring leaf-cells by the "cellular index" [see Bot. Absts. 11, Entry 2659] to *Fissidens crassipes* Wils. and its European allies. In *F. crassipes* itself he finds much variation, the index ranging from 4,052 (cells per square mm.) to 16,876; and, on the basis of differences in cell measurements, he distinguishes the 3 groups *laxiretis*, *medioretis*, and *densiretis*. In *F. Mildeanus* Schimp., a species very close to *F. crassipes*, the cellular index ranges (in round numbers) from 5,370 to 6,611; and in *F. rufulus* Br. Eur. from 10,700 to 14,950. The figures obtained for the other species in the group, *F. Monguilloni* Thér., *F. Arnoldi* Ruthe, and *F. rivularis* Spruce, are hardly numerous enough to have much significance.—A. W. Evans.

571. ANDREWS, A. LeROY. *Hymenostomum* in North America. II. The case of *Astomum Sullivantii*. Bryologist 25: 66-71. 1922.—The author concludes that *Astomum crispum* (Hedw.) Hampe of Europe does not occur in North America, plants so referred being mostly *A. Sullivantii* B. & S. The earliest name of this latter plant is *Phascum Muhlenbergianum* Swartz, necessitating the new combination *Hymenostomum Muhlenbergianum* (Swartz) Andrews; the types both of Swartz's and of Bruch and Schimper's species have been studied. While the actual type specimen of *Astomum nitidulum* B. & S. was lost by Sullivant, a study of authentic material and of drawings leads to the conclusion that the material was hybrid in origin. The distinction between *A. crispum* and *A. Sullivantii* is largely quantitative though fairly constant, but the plants could be treated as marked geographic varieties. The author notes that the occurrence of *A. crispum* in China and Japan needs careful investigation, questions (in a foot-note) the validity of *A. multicapsulare* (Sm.) B. &

S., and states that *A. intermedium* Péterfi has not yet found a place in European bibliography.—E. B. Chamberlain.

572. ARMITAGE, E. Notes. Moss Exchange Club Ann. Rept. [Arbroath] 26: 282. 1921.—Several varieties of mosses are recorded for the first time from Herfordshire [England], and 2 old reports for the county are corrected.—A. W. Evans.

573. ARMITAGE, E. [Notes.] Moss Exchange Club Ann. Rept. [Arbroath] 27: 297, 298. 1922.—Certain published records for the hepatics of the English counties of Worcester, Stafford, and Warwick and for the mosses of the county of Hereford are corrected, having been based on incorrect determinations, and the following new records are given: *Lophocolea alata* for Worcestershire; *Calypogeia Neesiana*, *Lophozia longiflora*, and *Riccia sorocarpa* for Staffordshire; and *Eucalyx hyalinus* for Warwickshire.—A. W. Evans.

574. ARNELL, H. W. Die schwedischen Arten der Gattungen *Diplophyllum* und *Martinellia*. Pflanzegeographische Skizzen. [The Swedish species of the genera *Diplophyllum* and *Martinellia*. Plant geographical sketches.] 8 vo., 82 p., 34 fig. Göteborg, Sweden, 1922.—The present paper is the 1st of a proposed series on the distribution of liverworts in Sweden. It is based on material in the herbaria of the author, the University of Upsala, and the Royal Museum at Stockholm and thus makes no claims to be absolutely complete. Of the 2 genera discussed *Diplophyllum* is represented by 5 species in Sweden, so far as known, and *Martinellia* by 29. Under each species the distribution is noted in great detail, the separate stations being listed under the 28 political districts of Sweden. Each species is further accompanied by full notes on habitats, by a statement regarding the oldest known Swedish specimen, and often (especially in the case of recently described species) by critical remarks or descriptions. The following new combinations are proposed: *Martinellia cuspiduligera* (Nees), based on *Jungermannia cuspiduligera* Nees; *M. dentata* (Dum.), based on *Scapania dentata* Dum.; and *M. lingulata* (H. Buch), based on *S. lingulata* H. Buch. *Scapania helvetica* Gottsche, which is considered identical with *S. geniculata* Massal., is reduced to synonymy or varietal rank under *M. irrigua* (Nees) Lindb. The paper contains in addition a revision of the species occurring in Siberia and also notes on a few specimens from various scattered localities. According to the data at hand 3 species of *Diplophyllum* and 16 of *Martinellia* are now known from Siberia, including the recently described *M. tundrae* Arnell (see following entry), and 4 of these species represent additions to the flora of that country. As an addition to the flora of Norway, *M. scandica* Arnell & H. Buch [see Entry 576, this issue] is cited. The figures represent graphically the distribution of the various species according to the 28 divisions of Sweden.—A. W. Evans.

575. ARNELL, H. W. *Martinellia tundrae* Arnell, nova species. Bot. Notiser 1921: 289–291. 9 fig. 1921.—The species here described and figured under the above name was based on material collected by the author at Dudinka, Yenisei, Siberia, in August, 1876. It is assigned to the *M. undulata*-group.—A. W. Evans.

576. ARNELL, H. W., et H. BUCH. *Martinellia scandica* nov. spec. Bot. Notiser 1921: 1, 2. 1921.—The new species described under the above name was based on material from Sweden and Finland. It is assigned to the *M. curta*-group.—A. W. Evans.

577. BARTRAM, EDWIN B. Some Nova Scotia mosses. Rhodora 24: 121–124. 1922.—The author lists 35 species of mosses from central and southwestern Nova Scotia, based on his collections of July, 1921. Of these species *Sphagnum macrophyllum* Bernh., which is new to Canada, and *Grimmia Olneyi* Sulliv. are especially noteworthy. Full data regarding stations and occasional descriptive or critical notes are included.—M. L. Fernald.

578. BROECK, H., VAN DEN. De Muscineën. [The Muscineae.] Natuurwetenschapp. Tijdschr. 4: 86–88. 1922.—The author gives the distinctive features of 21 mosses and 6 hepatics found in the vicinity of Antwerp, Belgium.—A. W. Evans.

579. DUPLER, A. W. *The male receptacle and antheridium of Reboulia hemisphaerica.* Amer. Jour. Bot. 9: 285-295. Pl. 14, 46 fig. 1922.—The male receptacle of this species is normally dorsal and posterior to the female receptacle. It is typically lunate in outline and sessile. The species is monoecious, although bisexual receptacles are occasionally found. The antheridia do not develop in strict acropetal succession, as Haupt states, but show a tendency to arise centrifugally. Several variations from the usual marchantiaceous type of development were found. The male receptacle seems to be a plastic structure, and the author believes it may represent an elementary stage of a branch-system, showing transitions from the "dorsal outgrowth" type to the "composite branch-system" type.—E. W. Sinnott.

580. HERZOG, TH. *Hypnum Lorentzianum* Mol. Eine bryogeographische Skizze. [Hypnum Lorentzianum. A moss-geographical sketch.] Krypt. Forsch. Bayer. Bot. Ges. München 5. 345-353. 2 fig. 1920.—The author discusses the geographical distribution and morphological features of "*Hypnum*" *Lorentzianum* in considerable detail. The species is largely confined to the region lying between the Rhine and Inn Rivers and may be regarded as one of the character-mosses of the northern foothills of the Alps. It occupies a somewhat isolated position among European species and should be known as *Brotherella Lorentziana* (Mol.) Fleisch., the genus *Brotherella* being mainly composed of species from eastern Asia. Although Fleischer places this genus between *Rhaphidostegium* and *Sematophyllum* the author considers it more closely allied to *Heterophyllum*.—A. W. Evans.

581. [HUSNOT, T.] [Rev. of: GYÖRFFY, I. *Bryologische Seltenheiten XIII.* (Bryological anomalies.) Hedwigia 63: 48-49. 3 fig. 1921 (see Bot. Absts. 11, Entry 1634).] Rev. Bryologique 48: 77. 1921.—The reviewer shows that the author's figures of coalesced capsules in *Bryum pallescens* are very similar to figures of *B. Donianum* published by Potier de la Varde in 1920 [see Bot. Absts. 7, Entry 1977]. He adds that anomalies of this type seem to be less rare in *Bryum* than in other genera.—A. W. Evans.

582. KRAUSE, ERNST H. L. *Zweiter Nachtrag zur Rostocker Moosflora.* [Second supplement to the Rostocker Moosflora.] 8 vo., 2 p. Rostock, 1922.—The original moss flora of Rostock and the 1st supplement have already been abstracted [see Bot. Absts. 11, Entries 2268, 2269]. In the 2nd supplement 6 mosses and 3 hepatics are added to the flora, additional data regarding other species are given, and several new combinations are formed.—A. W. Evans.

583. NAVEAU, R. *Sphagnum Vandenbroeckii* n. sp. R. Nav. Natuurwetenschapp. Tijdschr. 4: 144, 145. 9 fig. 1922.—Under the above name the author describes a new species of *Sphagnum* from Ruwenzori in the Lamuri-Congo, Africa. It was based on material collected by Bequaert.—A. W. Evans.

584. PEARSON, WM. HY. *Notes on a collection of Hepaticae from Belgian Congo (ex herb. R. Naveau, Antwerp).* Natuurwetenschapp. Tijdschr. 4: 118-143. Pl. 1-18. 1922.—The present report is based on a series of specimens collected in various parts of the Belgian Congo, Africa, by Corbisier, Lacomblez, Poma, Vanderyst, and Vermoesen. The species listed number 26, of which the following are proposed as new and figured: *Acrolejeunea Orchidae*, *Eulejeunea compressistipula*, *Frullania platyflora*, *Lopholejeunea Vermoesenii*, *Mastigolejeunea Lacomblezii*, *Plagiochila fragilifolia*, *P. Naveauiana*, *P. Pomai*, *P. strictifolia*, *Prionolejeunea Corbisieri*, *P. uncatifolia*, and *Riccia radicata*. Full data regarding localities are given in each case, and many of the species are accompanied by critical remarks.—A. W. Evans.

585. POTIER DE LA VARDE, R. *Observations sur quelques espèces du genre Fissidens.* [Observations on certain species of the genus Fissidens.] Rev. Bryologique 48: 70-72. 1921. The earlier parts of the series to which this article belongs have already been abstracted [see Bot. Absts. 8, Entry 1270]. In the present part the author records *Fissidens Monguilloni* Thériot for the 1st time from the French departments of Vendée and Loire-Inférieure. He

then discusses No. 158 of Husnot's Musci Galliae. This specimen was collected in Monaco and distributed as *F. incurvus* Schwaegr.; it should, however, be referred to *F. Bambergeri* Schimp., the distinctive characters of which are enumerated.—A. W. Evans.

586. SCHADE, A. Die Lebermoosflora der Oberlausitz. [The liverwort flora of the Upper Lausitz.] Festschr. zur Feier des 75 jähr. Bestehens der Naturwissenschaftl. Ges. Isis in Bautzen. 22 p. 1921.—The liverworts of eastern Saxony (in which the Upper Lausitz is situated) and the neighboring parts of Bohemia have received the attention of several students of the Hepaticae, and the author has incorporated the results of earlier explorations with his own. The species enumerated for this region total 135, of which 5 represent additions to the flora of Saxony. Each species is accompanied by full data regarding stations and collectors. The following are among the more interesting species listed: *Calypogeia arguta* Mont. & Nees, *Hygrobiella laxifolia* (Hook.) Spruce, and *Madotheca Porella* (Dicks.) Nees. In the author's opinion the 1st represents a recent introduction while the other 2 should be regarded as probable relicts of the Glacial Period.—A. W. Evans.

587. THÉRIOT, I. Contribution à la flore bryologique du Chili. [Contribution to the bryological flora of Chile.] Rev. Chilena Hist. Nat. 25: 289-312. Pl. 23-27. 1921.—This is the 4th article published by the author under the above title; the 3rd has already been abstracted [see Bot. Absts. 4, Entry 1042]. The present report is based mainly on specimens collected by J. A. Campo, N. Costes, C. Deltor, and F. Jaffuel in various parts of Chile. The species listed number 48 and are accompanied by full data regarding localities and also, in many cases, by descriptive notes. The following species are proposed as new, Thériot being the authority except where otherwise indicated: *Barbula Costesii*, *B. fuscoviridis* Broth., *Brachysteleum Deltori*, *Fissidens Costesii*, *Funaria Costesii*, *Orthotrichum bicolor*, *Pentastichiella Jaffueli*, *Pleuroidium Costesii*, *Tortula atrata*, *T. Costesii*, and *Zygodon Jaffueli*. In addition *Pseudocrossidium pachyneuron* (Dusén) Thériot, based on *Barbula pachyneura* Dusén, is proposed as a new combination, and new varieties are described under *Fissidens Brotherianus* Par., *Macromitrium paraphysatum* Mitt., and *Tortula papillosa* Wils. Thériot's new species, 2 of his new varieties, and *Orthotrichum assimile* C. M. are figured on the accompanying plates.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 181, 183, 184, 198, 223, 410, 531, 718, 758, 780, 788, 789, 808, 812, 820, 821, 863, and those in Section Pathology)

FUNGI

588. BLUMER, S. Beiträge zur specialisation der Erysiphe horridula Lév. auf Boraginaceen. [Contributions on the specialization of Erysiphe horridula Lév. on the Boraginaceae.] Centralbl. Bakt. II Abt. 55: 480-505. Fig. 1. 1922.—A biological and morphological study of the forms of *Erysiphe cichoracearum* on the Compositae and Boraginaceae is reported. The forms on the Boraginaceae are placed under a separate species, *E. horridula*; the weaker specialization and the more uniformly 3-spored asci of the forms on the borages are taken as the bases of separation.—Anthony Berg.

589. BOURDOT, H., et A. GALZIN. Hyménomycètes de France. (VII Stereum) suite. [Hymenomycetes of France.] Bull. Trimest. Soc. Mycol. France 37: 117-130. 1921.—The author continues his treatment of the genus *Stereum*, describing 17 species. [See also Bot. Absts. 10, Entry 1206.]—D. S. Welch.

590. BOURDOT, H., et L. MAIRE. Notes critiques sur quelques Hyménomycètes nouveaux ou peu connus. [Some new or little known Hymenomycetes.] Bull. Trimest. Soc. Mycol. France 36: 69-85. 1 fig. 1920.—Species from the following genera are described and discussed: *Platyglœa*, *Evidia*, *Tremella*, *Sebacina*, *Exidiopsis*, *Bourdodia*, *Ditiola*, *Clavaria*, *Corticium*, *Peniophora*, *Grandinia*, *Asterostromella*, *Hypochnus*, *Phylacteria*, *Tomentella*, *Trametes*, *Leptosporus*, *Irpez*, *Poria*, *Xanthochrous*.—D. S. Welch.

591. BROQ-ROUSSEAU, M. Les recherches mycologiques en médecine vétérinaire. [Mycological researches in veterinary medicine.] Bull. Trimest. Soc. Mycol. France 37: 99-103. 1921.—A laboratory for veterinary research has been established by the minister of war. Attention is called to the fact that many diseases of horses are caused by fungi. The following are reported: Favose thrush caused by a fungus referred to *Achorion gypseum* Bodin. Microsporic thrush, of which 2 cases are reported; from one of these Sabouraud isolated *Microsporon lanosum*, and in another Bodin describes *M. equinum*. Four species of *Trichophyton* have been reported to cause Trichophytic thrush. The perfect stages of these forms are for the most part unknown. It has been suggested that they belong to the Gymnoascaceae. Sporotrichosis is caused in horses as in man by *Sporotrichum Beurmanni* Matruchot & Ramond. Epizootic lymphangitis, caused by a *Cryptococcus* of uncertain relationships, is confined to Africa. The streptothrix group is widely distributed and contains among other organisms the one causing actinomycosis of man and animals. A *Streptothrix* has been found causing decomposition in grain and forage. Mouldy or decayed feed has been held responsible for cases of severe poisoning.—D. S. Welch.

592. BUBÁK, FR. Fungi aus Mesopotamien und Kurdistan, sowie Syrien und Prinkipo. Nachträge. [Fungi from Mesopotamia and Kurdistan, also Syria and Prinkipo.] Ann. Naturhist. Mus. Wien 34: 69. 1921.—Two species, *Tichothecium erraticum* Mass. and *Lindauopsis* sp., are added to a preceding article [op. cit. 28: 189].—A. S. Hitchcock.

593. BUCHEIM, ALEXANDER. Zur Biologie von *Uromyces Pisi* (Pers.) Winter. [On the biology of *Uromyces Pisi*.] Centralbl. Bakt. II Abt. 55: 507-508. 1922.—In culture studies made near Moscow uredospores of *Uromyces Pisi* from *Lathyrus pratensis* L. infected *Pisum sativum* L., *P. arvense* L., *Lathyrus Nissiola* L., and *L. articulatus* L. This confirms Jordi's conclusion that the fungus on *Pisum* and *Lathyrus* is the same.—M. A. Raines.

594. CHIFFLOT, J. Sur quelques troubles provoqués par l'ingestion de *Inocybe rimosa* B. [Trouble caused by eating *Inocybe rimosa*.] Bull. Trimest. Soc. Mycol. France 37: 139-140. 1921.—*Inocybe rimosa* although commonly regarded as an edible species is reported to be poisonous when eaten in large quantity.—D. S. Welch.

595. CHIFFLOT, [J.] Un champignon de 20 kilos. [A fungus weighing 20 kilos.] Bull. Trimest. Soc. Mycol. France 37: 138-139. 1921.—A very large specimen of *Polyporus sulfureus* was sent to the author for identification.—D. S. Welch.

596. HEDGCOCK, GEORGE G., and GLENN GARDNER HAHN. Two pine cone rusts and their new cronartial stages. Part I. *Cronartium strobilinum* (Arthur) Hedgc. and Hahn, comb. nov. Phytopathology 12: 109-116. Pl. 5. 1922.—A rust of the cones of *Pinus palustris* formerly attributed to *Caecoma strobilina* Arth. has been known to occur in Florida and nearby territory since 1892. It has also been found on cones of *Pinus heterophylla* throughout the same range. Recently the authors have found that the aecial sori possess a peridium like the true *Peridermiums*. A *Cronartium* which occurs on the leaves of *Quercus virginiana* and of *Q. geminata* has been proved, by cross inoculations in the greenhouse, to be the alternate stage of the fungus. The leaves of several other species of *Quercus* and also species of *Castanea* have been successfully inoculated with aeciospores from the pine cones; but teliospores were not produced on deciduous leaves. The fungus is redescribed as *Cronartium strobilinum* (Arth.) comb. nov.—B. B. Higgins.

597. HEDGCOCK, GEORGE G., and N. REX HUNT. Two pine cone rusts and their new cronartial stages. Part II. *Cronartium conigenum* (Pat.) Hedg. & Hunt, comb. nov. *Phytopathology* 12: 116-122. Pl. 6. 1922.—The aecial sori of *Caeoma conigenum* which occur on the cones of *Pinus chihuahuana* possess a true peridium. The alternate stage is a *Cronartium* which occurs on the leaves of *Quercus Emoryi* and *Q. hypoleuca*. The fungus is redescribed as *Cronartium conigenum* (Pat.) comb. nov.—B. B. Higgins.

598. HUNTER, ALBERT C. A pink yeast causing spoilage in oysters. U. S. Dept. Agric. Bull. 819. 24 p. 1920.—The organism causing a pink color in shipped oysters is a yeast-like fungus belonging to the group *Torulæ*. It was found in large numbers in the oyster-house and on utensils in and about the house, less frequently in oysters before they were brought to the house. For the purpose of preventing the infection of opened oysters, the house and utensils should be washed occasionally, through the opening season, with a 1-2500 formaldehyde solution (formalin 1-1000).—D. S. Welch.

599. LEBEDIEVA, L. A. Fungi novi in horto botanico Petropolitano annis 1921-22 collecti. [New fungi collected in 1921-22 in the botanical garden of Petrograd.] *Notulae Systematicae Inst. Cryptogamico Hort. Bot. Petropolitani* 1: 62. 1922.—A new species of the *Sphaeropsidaceae* occurring on dead branches of species of *Spiraea* and *Sorbaria* is described. It is considered the pycnidial stage of *Scleroderris Spiraeae* Rehm, which was found on the same branches. This fungus, named *Sirodiplospora Spiraeae* Lebed., is very close to *Sirodiplospora sambucina* Naoumov on *Sambucus racemosa*, which seems to be the pycnidial stage of *Scleroderris sambucina* Naoumov. (Both forms were discovered in Tsarskoie Sielo near Petrograd and described by N. Naoumov.)—A. Jacewski.

600. VUILLEMIN, M. P. Quelques formes thermophiles de l'*Aspergillus glaucus*. [Some heat-resistant forms of *Aspergillus glaucus*.] *Bull. Soc. Sci. Nancy* 1: 15-16. 1920.—Four races of *Eurotium repens* enduring a temperature of 38°C. were studied. The material was secured from (1) pus from a felon; (2) gangrenous lesion in frozen feet; (3) inflamed groin; (4) lymph of the cheek. The last case was conclusive because the perithecia developed in the midst of living tissues, were extracted with every precaution, and by culture reproduced *Aspergillus glaucus* and the perithecia characteristic of a variety of *Eurotium repens*.—A. Chaze.

LICHENS

601. KEISSLER, KARL. Systematische Untersuchungen über Flechten-Parasiten und lichenoiden Pilze. [Systematic investigations on parasitic lichens and lichen-like fungi.] *Ann. Naturhist. Mus. Wien* 34: 70-78. 1921.—This is Part 2, nos. 12-20 of the contribution [1st part in *Beih. Bot. Centralbl.* 37: 263. 1920]. The following are discussed: 12. *Didymella tiliaginea* and *Sphaerulina tiliaris*; 13. *Mycarthopyrenia Sorbi* n. gen. et n. sp., on *Sorbus Aucuparia*, Austria; 14. *Agyrium hepaticolum* n. sp., Austria; 15. *Pleionoscutula Brouardi*; 16. *Durella Lecideola* var. *coeruleo-viridis* n. var., Poland; 17. *Lecanidion Bachmannianum* n. sp., Poland; 18. *Cyrtidula nostochinea*; 19. *Cyrtidula pteleodes*; 20. *Aposphaeria Cladoniae* and *Phoma uncialicola*.—A. S. Hitchcock.

602. STEINER, J. Lichenes aus Mesopotamien und Kurdistan sowie Syrien und Prinkipo. [Lichens from Mesopotamia and Kurdistan, also Syria and Prinkipo.] *Ann. Naturhist. Mus. Wien* 34: 1-68. 1921.—An annotated list is presented of lichens collected by Handel-Mazzetti, with numerous new forms, varieties and species, and new combinations. The new species are: *Verrucaria emergens*, Syria; *V. syriaca*, Syria; *V. sordidula*, Mesopotamia; *Thelidium myriocaroides*, Syria; *Staurothele praecedens*, eastern Kurdistan; *Biatorella leucothallina*, near Aleppo; *Acarospora Bornmülleri*, Mesopotamia; *A. Handelii*, Mesopotamia; *Gonohymenia mesopotamica*, Mesopotamia; *Lecanora kurdistanica*, western Kurdistan; *L. amylophora*, Syria; *L. radians*, Bitlis [Armenia]; *L. subfarinosa*, Mesopotamia; *L. syriaca*, Syria; *L. kjachtensis*, northern Mesopotamia and Kurdistan; *L. ferruginea*, Syria; *Caloplaca fuscula*, Mesopotamia; *C. Handelii*, Mesopotamia.—A. S. Hitchcock.

BACTERIA

603. AYERS, S. HENRY, and COURTLAND S. MUDGE. **The streptococci of the bovine udder.** IV Studies of the Streptococci. Jour. Infect. Diseases 31: 40-50. 1922.—Methods of isolation and the special technique of the cultural methods used for the differentiation of the different types are described. *Streptococcus mastitidis* was found to be the prevalent type in the udder of the cow, it being found in normal animals. It is differentiated from the closely allied *S. pyogenes* on the basis of final pH and difference in ability to hydrolyze sodium hippurate. It is not believed that *S. mastitidis* is pathogenic for man when consumed in milk. Due to the small amount of acid produced in test substances, a new species has been described and named *Streptococcus acidominimus*.—R. V. Allison.

604. FABRY, PAUL. Note sur le Bacille coli modifié ne produisant plus d'indol. [A note on a modified form of *Bacillus coli* which does not produce indol.] Compt. Rend. Soc. Biol. 87: 113-115. 1922.

605. LACY, G. R., and A. C. MURDOCH. **Encapsulated non-gas-forming bacilli.** Jour. Infect. Diseases 31: 64-71. 1922.—The morphological, cultural, and immunological characteristics of an encapsulated, non-gas-forming, aerobic bacillus as isolated from 3 patients suffering with some pathologic condition of the genito-urinary tract are presented. It was not found possible to determine whether the organism was the primary etiologic factor or only a secondary invader. The brief literature upon this type of organism is reviewed and the need of further study of the general group emphasized.—R. V. Allison.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 131, 207, 227, 262, 543, 914)

606. BERRY, EDWARD W. **Additions to the flora of the Wilcox group.** U. S. Geol. Surv. Professional Paper 131: 1-21. Pl. 1-18. 1922.—Additions to the lower Eocene flora of the Mississippi embayment region are described. Plant lists from new localities, various previously known species, taxonomic changes, and the following new species are included: *Marchantites stephensoni*, *Acrostichum* sp., *Cupressinoxylon wilcoxense*, *Palmocarpon butlerensis*, *Artocarpoides balli*, *Menispermites cebathoides*, *Monocarpellites perkinsi*, *Sterculia wilcoxensis*, *Helictoxylon wilcoxianum*, *Laurus verus* (fruits), *Laurinoxylon wilcoxianum*, and *Pterobalanus texanus* (a new genus of winged fruits).—E. W. Berry.

607. BERRY, EDWARD W. **Saccoglottis, recent and fossil.** Amer. Jour. Sci. 4: 127-130. 1922.—*Saccoglottis tertiaria* n. sp. from the Pliocene of Bolivia is described and *S. amazonica* is recorded from Panama Bay. Distribution and means of dispersal are discussed.—E. W. Berry.

608. BERRY, EDWARD W. **The geologic evidence of evolution.** Sci. Monthly 15: 97-118. 1922.—This article is a brief summing up in non-technical language of the geological evidence of evolution.—“Evolution is not a theory of origins, nor an article of scientific faith, but an indisputable fact.” It should not be confused with the various theories that have been proposed to explain its factors or mode of operation.—The first man to see the transformation of species was Waagen, an Australian geologist who studied the minute changes in the successive species of *Ammonites* in the successive layers of the Jurassic. Other groups show the same thing; *Archaeopteryx* of the Jurassic, the elephants of the Miocene and Pliocene, the horses of the Cenozoic, and finally the record of man himself, with special mention of the recently discovered skeletons.—L. Pace.

609. CHANEY, R. W. Notes on the flora of the Payette formation. Amer. Jour. Sci. 4: 214-222. 1922.—A partial account is presented of the flora of the Payette formation of Idaho and adjacent areas in Oregon and which was formerly considered to be upper Eocene in age. The author makes additions to this flora—bringing the total number of species up to 49, discusses the environment which they indicate, and concludes that the age is Miocene.—E. W. Berry.

610. FRENTZEN, K. Beiträge zur Kenntnis der fossilen Flora des südwestlichen Deutschland. [Contribution to the fossil flora of southwestern Germany.] Jahresber. u. Mitteil. Oberrhein. Geol. Ver. N. F. 10: 63-73. 1921; 11: 1-14. 1922.—The 1st contribution gives an account of the author's studies of late Triassic florules from Adelshausen, Rappersweier, and Malsch in southwestern Germany. The 2nd consists of a brief comparison of the Keuper flora of Baden, Thuringia, and adjacent regions with that contained in the Schilf sandstone of the same areas.—E. W. Berry.

611. GILKINET, ALF. Flore fossile des Psammites du Condroz. [Fossil flora of the upper Devonian of Condroz.] Mém. Soc. Géol. Belgique 1921-1922: 1-21. Pl. 1-13. 1922.—The following typical upper Devonian species from Condroz, Belgium, are described: *Sphenopteris condrosorum*, *S. flaccida*, *S. Schimperiana*, *Triphyllopteris elegans*, *Archaeopteris Roemeriana*, *Asterocalamites scrobiculatus*, and *Lepidodendron nothum*.—E. W. Berry.

612. GILKINET, ALF. Plantes fossiles de l'argile plastique d'Andenne. [Fossil plants from the plastic clay of Andenne.] Mém. Soc. Géol. Belgique 1921/1922: 23-40. Pl. 14-17. 1922.—The following species of Aquitanian or lower Miocene age are recorded from the clay pits of Champseau near Andenne, Belgium: *Sphaeria lignitum*, *Lygodium Gaudini*, *Salvinia cordata*, *Sequoia Couttsiae*, *Taxodium distichum miocenicum*, *Phragmites oeningensis*, *Rhizocaulon gypсорum*, *Stratiotes Websteri*, *Alnus Kefersteini*, *A. gracilis*, *Populus glandulifera*, *Nyssa* sp., *Comptonia Schrankii*, *Cinnamomum Scheuchzeri*, *C. lanceolatum*, *Gardenia Wetzleri*, *Echitonium cuspidatum*, *Acer trilobatum* and its variety *cuspidatum*, and *Ilex Dardenniana*. The last is the only new species. From these same clays but of unknown age are described cones of *Pinus sylvestris*, *P. Laricio*, and *P. Pinaster*? These last are late Tertiary or Pleistocene.—E. W. Berry.

613. HYLANDER, C. J. A Mid Devonian Callixylon. Amer. Jour. Sci. 4: 315-321. 1922.—The author describes *Callixylon Marshii* n. sp., a type of Cordaitan wood with segregated groups of pits, and in this species showing growth rings. The specimen is from the Devonian of 18 Mile Creek, New York.—E. W. Berry.

614. IWASAKI, C. A fundamental study of Japanese coal. Tech. Rept. Tohoku Imp. Univ. 24: 1-41. Pl. 1-9. 1922.—A continuation of the author's previously published work on the technology of Japanese coals.—E. W. Berry.

615. JOHANSSON, NILS. Die Rätische Flora der Kohlengruben bei Stabbarp und Skromberga in Schonen. [The Rhaetic flora of the coals of Stabbarp and Skromberga in Schonen] K. Svensk. Vetenskap. Akad. Handl. 63⁴: 1-78. Pl. 1-8. 1922.—A monographic account is given of the Rhaetic or late Triassic flora of these 2 localities in southern Sweden. The flora comprises 4 Equisetales, 1 Lycopodiales, 18 Filicales, 11 Cycadophyta, 7 Ginkgophyta, 6 Coniferophyta, and 2 plants of unknown affinities. It consists for the most part of well known Rhaetic types. Considerable is added to our knowledge of some of these and the following are described as new: *Cladophlebis Svedbergii*, *C. sublobata*, *C. Sewardii*, *C. divaricata*, *Cycadolepis rugosa*, and seeds of the cycadophyte genus *Nilssonina*.—E. W. Berry.

616. JOHANSSON, NILS. Pteryopteris eine neue Farngattung aus dem Rät Schonen. [Pteryopteris, a new fern genus from the Rhaetic of Sweden.] Ark. Bot. 17: 1-6. Pl. 1. 1922.—A new genus of ferns based upon *Polypodites*? *Angelini* Nathorst is described from the

upper Triassic of southern Sweden. Comparisons are made with *Laccopteris* and *Dictyophyllum* and the author concludes that the systematic position of *Pterygopteris* cannot be satisfactorily determined at present.—*E. W. Berry.*

617. KEIDEL, J. Sobre la distribución de los depósitos glaciares del Pérmico conocidos en la Argentina y su significación para la estratigrafía de la serie de Gondwana y la paleogeografía del hemisferio austral. [On the distribution of Permian glacial deposits in Argentina and their significance in the paleogeography and stratigraphy of the Gondwana series.] Bol. Acad. Nacion. Cien. Córdoba 25. 1922.—A summary account is given of the occurrences of Permian glacial deposits in Argentina and a discussion of the contained *Glossopteris* flora and of the paleogeography of Gondwana Land.—*E. W. Berry.*

618. KNOWLTON, F. H. A fossil dogwood flower. Amer. Jour. Sci. 4: 136-138. 1922.—A fossil flower, *Cornus speciosissima* n. sp., from the Fort Union (lower Eocene) of Wyoming is described.—*E. W. Berry.*

619. KODAIRA, R. Fossil nut-shells of *Juglans Sieboldiana Maximovicz* in the lignite of Asahiyaama, near Nagano City, Province of Shinano. Jour. Geol. Soc. Tokyo 23: 1-8. Pl. 12. 1921.—The age is Pleistocene; the remaining facts are set forth in the title.—*E. W. Berry.*

620. KRÄUSEL, R. Der Bau des Wundholzes bei fossilen und rezenten Sequoien. [The structure of traumatic wood in fossil and recent Sequoias.] Senckenbergiana 3⁵: 135-142. 1921.—The author discusses the relationships between fossil and recent species of *Sequoia* and *Taxodium* as shown by the structure of the traumatic areas of the wood, referring several fossil types such as *Cupressinoxylon wellingtonioides* Kräusel, *C. taxodioides* Platen, *C. Holdenae* Seward, *Taxodioxylon sequoianum* Kräusel, and *T. Credneri* Platen to *Sequoia*.—*E. W. Berry.*

621. KRÄUSEL, R. Die Nahrung von Trachodon. [The food of Trachodon.] Palaeontol. Zeitschr. 4: 80. 1922.—From a mass of sandy carbonaceous matter inside the cadaver of the dinosaur *Trachodon* the author identifies the needles of *Cunninghamites elegans*, fragments of coniferous and dicotyledonous foliage, seeds or fruits, pollen, and eyes of water insects.—*E. W. Berry.*

622. KRÄUSEL, R. Fossile Hölzer aus dem Tertiär von Süd-Sumatra. [Fossil woods from the Tertiary of southern Sumatra.] Verhandl. Geol. Nederland. u. Kolonien, Geol. Ser. 5: 231-287. Pl. 1-7, fig. 1-29. 1922.—The following new species of woods from the Tertiary, mostly Miocene, of Java, are described: *Djambioxylon sumatrense*, possibly belonging to the Combretaceae; *Dipterocarpozylon Tobleri*, and 2 unnamed forms of the same genus; *Sapindoxylon Janssonii*; *Anacardioxylon Mollii*, *Caesalpinioxylon palembangense*; *Palmoxylon taudjungense*; and *Tarrietioxylon sumatrense*, which is related to the existing genus *Tarretia* of the Sterculiaceae.—*E. W. Berry.*

623. KRÄUSEL, R. Über einige fossile Koniferenhölzer. [On several fossil coniferous woods.] Senckenbergiana 3⁵: 129-135. 1921.—The author discusses *Paläotaxodioxylon Grünwettersbachense* Frentzen, a coniferous wood from the Bunter (lower Triassic) of Baden advancing arguments tending to prove its Araucarian affinity instead of its supposed Abietinean relationship as suggested by its describer. The author discusses also *Pityoxylon Schenkii* Kraus, a Tertiary species, showing its relationship with the *Sequoia* rather than with the *Pinus* types of fossil woods.—*E. W. Berry.*

624. NATHORST, A. G. Einige Psymgophyllum-Blätter aus dem Devon Spitzbergens. [Several Psymgophyllum leaves from the Devonian of Spitzbergen.] Bull. Geol. Inst. Upsala 18: 1-8. Pl. 1. 1922.—*Psymgophyllum Williamsoni* and a new species, *Psymgophyllum? pusillum*:(Ginkgoales), from the upper Devonian of Spitzbergen are described.—*E. W. Berry.*

625. ROUND, EDA M. *A Crossotheca from the Rhode Island Carboniferous.* Amer. Jour. Sci. 4: 131-135. 1922.—*Crossotheca nana*, a new species, from the Carboniferous of the Narragansett basin in Rhode Island is described and compared with various European species.—E. W. Berry.

626. SEAWARD, A. C. *Fossil plants from the Tanganyika Territory.* Geol. Mag. 59: 385-392. Pl. 17. 1922.—*Eretmophyllum?*, *Ulmannia*, and *Voltzia*, all poorly preserved, and, according to the author indicating a Triassic age, are recorded from the Tanganyika district in Africa.—E. W. Berry.

627. THOMAS, H. H. *On some new and rare Jurassic plants from Yorkshire.* V. Fertile specimens of *Dictyophyllum rugosum* L. and H. Proc. Cambridge Phil. Soc. 21: 110-116. Pl. 1. 1922.—The sporangial characters and the venation seem to indicate that the nearest living relative of the Jurassic *Dictyophyllum rugosum* is the modern *Cheiropleuria bicuspis*.—Michael Levine.

628. WENZ, W. *Das Mainzer Becken und seine Randgebiete.* [The Mainz basin and surroundings.] Willy Ehrig: Heidelberg. 1921.—In this account of this classic region for Tertiary geology the author lists and figures the fossil plants from the various Tertiary horizons represented in that region.—E. W. Berry.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 4, 17, 23, 24, 31, 57, 72, 82, 87, 90, 97, 115, 116, 117, 143, 152, 153, 165, 166, 169, 171, 181, 198, 203, 285, 335, 343, 345, 358, 366, 402, 420, 422, 428, 430, 439, 442, 452, 461, 464, 466, 473, 474, 481, 487, 503, 542, 591, 732, 758, 766, 771, 789, 790, 811, 815, 821, 844, 848, 896)

DISEASES CAUSED BY FUNGI

629. ANONYMOUS. *Cocoe rot.* Jour. Jamaica Agric. Soc. 26: 62-64. 1922.—A wilt and tuber rot of cocoes or tancias (*Colocasia* sp.) due to a vascular parasite (*Hormiscium Colocasiae* Ashby) has caused severe losses to the crop in Jamaica.—John A. Stevenson.

630. ANONYMOUS. *Potato blight.* Jour. Jamaica Agric. Soc. 25: 371-373. 1922.—A serious epidemic of potato blight (*Phytophthora infestans*) due to wet weather and late planting reduced the crop from one half to two thirds. Lowland plantings escaped the disease. Spraying with Bordeaux mixture is recommended.—John A. Stevenson.

631. ALLEN, W. J., and J. M. ARTHUR. *Orchard experiments.* Sprays for peach curl on trial at Yanco. Agric. Gaz. New South Wales 33: 442-446. 2 fig. 1922.—Lime-sulphur on dormant trees controlled peach leaf curl effectively. Spraying when the buds were bursting was less effective and still less so when the buds were "pinking." A 2nd spraying, after the 1st dormant spraying, showed no increased efficiency. Results indicated that lime-sulphur diluted more than the standard formula (1 to 7) was effective. Further trials are needed.—L. R. Waldron.

632. BAUDYŠ, E. *Plísen bramborová.* [Late blight of potato.] Naše Snahy 9: 111-113. 1921.—All varieties are not equally affected by this disease. In comparative experiments which were performed in an experimental field on the Czecho-Moravian plateau the most susceptible variety was "Up-to-date," which was practically destroyed by the disease.

Slightly less susceptible were the varieties Bílý semenáč, Viktorka, Magnum bonum, Holandeské ranné, Kaplanka, Jiřiny, and Industrie. About 15 per cent of diseased tubers were found in the varieties Prof. Märcker, Potentat, Zlocien, Erfolg, Hassia, Ceres, Phönix, Cedan, Gracia, Pyselsky, Český, Skrobák, and Silesia. Varieties almost entirely healthy were Pac, Galathea, Prof. Woltman, Zelenač, Regent, Koruna, Vločkové, Swietéz, Gedymin, Svatová, Clavské, Deodara, and Topor. In the experimental field in Moravia the variety Prof. Woltman had about 50 per cent of diseased tubers; Koruna, 15 per cent; and Zlocien, about 25 per cent. The first 2 varieties were resistant in the experimental field on the Czecho-Moravian plateau, and the 3rd variety was slightly susceptible. Spraying with Bordeaux mixture is recommended for the control of the disease.—*E. Baudyš*.

633. [BAUDYŠ, E., a FR. STRAŇÁK.] Moření osiva proti plísni sněžné. [Treatment of the seed against snow mold.] Československý Zemědělec 3: 133-134. 1921.—The damage done by this disease (*Fusarium nivale*) is estimated to be 20 per cent, which in 1920 amounted to about 1,800,000 quintals of grain. In some places the damage is as high as 80 per cent. The disease attacks rye, wheat, and frequently winter barley. For control are recommended sublimate, uspulium, and fusariol. According to Baudyš, treatment with sublimate is most effective.—*E. Baudyš*.

634. BRERETON, W. LE GAY, and C. O. HAMBLIN. Black spot of the vine (*Gloeosporium ampelophagum*). Experiments with controls, 1920-21. Agric. Gaz. New South Wales 33: 433-436. 3 fig. 1922.—The experiments were conducted (1) to determine the best winter swabs and sprays, (2) to test summer control sprays, and (3) to test late season sprays for ripening fruit. Only (1) is reported. The winter swab,—sulphate of iron and sulphuric acid,—delayed bursting of the buds about 10 days. Bordeaux spraying controlled downy mildew successfully. Winter spraying or swabbing did not control black spot at Yanco as the disease did not appear until late spring or early summer. Swabbing reduces the total amount of infective material upon the vines and so provides against an early attack of the disease.—*L. R. Waldron*.

635. BURGER, O. F., and H. C. PARHAM. Peronospora disease of tobacco. Florida State Plant Bd. Quart. Bull. 5: 163-167. 1 fig. 1921.—During the latter part of March and the beginning of April, *Peronospora Hyoscyanii* De Bary was noticed for the 1st time in Florida (Gadsden County). The disease may have been introduced from Sumatra. Large brown spots 0.5-1 inch in diameter develop on the leaves. At first these spots are yellowish green; later they have a water-soaked appearance; and finally they become brown and papery. The brown spots soon drop out, leaving holes in the leaf. Plants grown under slats and cheese cloth were infected most, slat-shade plants less, and sun-grown tobacco least. It is believed that spraying the seedbeds with 2-2-50 Bordeaux mixture may control the disease. It is impracticable to spray plants which have attained a height of 18-24 inches. The disease is confined to the sand leaves, and the loss is probably not more than 1 per cent of the crop.—*J. C. Th. Uphof*.

636. CASTRO, CARLOS. Enfermedades del jitomate. [Tomato diseases.] Bol. Camara Agric. Nacion. Leon [Mexico] 94: 4-6. 1922.—*Fusarium Lycopersici* and *Phytophthora infestans* attack the tomato.—*John A. Stevenson*.

637. CHASE, W. W. Experimental dusting and spraying of peaches for 1919. Georgia State Bd. Entomol. Circ. 30. 13 p. 1920.—Results showed that dusts of sulphur, lime, and lead arsenate gave as good results in the brown rot control as liquid sprays and that the dusts were better for scab control. Curculio control on varieties as late as Elberta was not satisfactorily effected by dusts or sprays as the season was abnormal in rains. The amount of arsenate of lead recommended against curculio is 5 per cent.—*T. H. McHatton*.

638. CLEPERRI, R. Il marciume delle mele cotogne. [A rot of quince.] Riv. Patol. Veg. 12: 12-17. 1922.—A rot of quinces was found to be caused by *Penicillium crustaceum* (L.) Fries. Various anomalous forms of the fungus are described.—*F. M. Blodgett*.

639. COTTON, A. D. Potato pink rot: a disease new to England. Jour. Ministry Agric. Great Britain 28: 1126-1130. 1922.—The occurrence of the pink rot (*Phytophthora erythroseptica* Pethyb.) disease of potatoes was noted in 7 localities in 2 districts. Though this is the 1st discovery of the disease in England it is not necessarily implied that it then occurred in England for the 1st time; it may have been present and mistaken for blight in former years.—Affected plants present a “wilted” appearance and the tubers generally rot, the rot progressing from the stem to the eye end of the tubers.—M. B. McKay.

640. DOUGLAS, BRUCE. A new *Alternaria* spot of tomatoes in California. Phytopathology 12: 146-148. Fig. 1. 1922.—A peculiar spotting of tomato fruits that has been quite prevalent during the damp weather of late fall in California, has been found to be due to a species of *Alternaria*. On the fruits the spots are brown, circular in outline, and somewhat sunken but firm. Later the spots become covered with a dark velvety growth of *Alternaria* spores. Inoculations from pure cultures of this fungus were made by placing spores suspended in sterile water in droplets on the uninjured green fruits. Spots developed in 10-21 days.—B. B. Higgins.

641. DUFRENOY, J. Les maladies du melon. [Diseases of cantaloupes.] Ann. Épiphyties 7: 405-420. Fig. 1-16. 1921.—Cantaloupes grown in France suffer very much from a wilt disease, as many as 90 per cent of the plants being sometimes destroyed. A soil *Fusarium* was constantly isolated from diseased organs; it was successfully inoculated from cultures to seedlings, causing characteristic wilting, and reisolated to agar.—From morphological and cultural characters it is best referred to as *Fusarium Solani* var. *cyaneascens* subvar. *melonis*.—Bacteria are always associated with *Fusarium*, infecting tissues in advance of the hyphae.—Resistant strains of cantaloupes should be bred from such individuals as prove *Fusarium*-resistant in badly infected fields. Resistance was proved to be due to rapid formation of suber, walling out infected wounds.—J. Dufrenoy.

642. GREGORY, C. T. The relation of rain to the formaldehyde treatment of onion smut. Phytopathology 12: 155-156. 1922.—Field results with the drip method formaldehyde treatment for onion smut (*Urocystis Cepulae* Frost) indicate that excessive rain at the time of or just after planting may reduce the beneficial effects of the treatment.—B. B. Higgins.

643. GRUYER, P. Observations sur la biologie du *Tuberculina persicina* Ditm. [Observations on the biology of *Tuberculina persicina*.] Bull. Trimest. Soc. Mycol. France 37: 131-133. 1921.—*Tuberculina persicina* Ditm. is parasitic upon the aecidia of *Endophyllum Euphorbiae*. The parasite delays or prevents the development of the aecidiospores. It is suggested that it might be used as an agent for the control of certain Uredinaceous pests.—D. S. Welch.

644. HOPKINS, E. F. Varietal susceptibility of the Yellow Bellflower apple to cedar rust. Phytopathology 12: 190-192. Fig. 1. 1922.—Aecia, identified as *Gymnosporangium Juniperi-virginianae* Schw., were found to be very prevalent on twigs of the Yellow Bellflower apple while none were found on any trees of the other varieties in the orchard.—B. B. Higgins.

645. KUTIN, AD. Snět prosořá (*Ustilago Panicis-miliacei* Vrt.). [Millet smut and a method of its control.] Ochrana Rostlin 1: 20-22. Fig. 1. 1921.—Millet smut may be entirely controlled with chemicals or by throwing the seed through the fire. In eastern Bohemia the latter method is applied as follows: As many straw torches are made as might be necessary. They are made from small bundles of long straw tied with ropes of twisted straw. Two men are necessary to carry out the operation; one takes a straw torch in each hand, lights them, and holds them about 1 m. above the ground. The torches have to be held close together so that a broad flame is obtained. The other man pours the seed slowly through the flame. The method is rapid, cheap, and effective. In the district of Kralóve-Hradek (Königsgrätz) burning is done in a sieve over the flame, and in Moravia the seed is thrown directly into the fire made from short pieces of straw. Neither treatment affects the germination.—E. Baudyš.

646. LEWIS, A. C., and W. W. CHASE. Control of curculio and brown rot of peaches. Georgia State Bd. Entomol. Circ. 34. 4 p. 1921.—A spray schedule is given accompanied by a discussion of the relation of curculio to brown rot.—*T. H. McHatton*.

647. LINE, J. A note on the biology of the "crown-gall" fungus of lucerne. Proc. Cambridge Phil. Soc. 20: 360-365. 1921.—The author confirms the work of other students and ascribes the disease to *Urophlyctis Alfalfae* Lagerh. The name "marble gall" is again suggested to distinguish it from the crown gall of bacterial origin. The galls of the lucerne are hypertrophied buds or bud parts.—*Michael Levine*.

648. McCLELLAND, T. B. The coffee leaf-spot in Porto Rico. Porto Rico Agric. Exp. Sta. Bull. 28. 12 p., pl. 1-4. 1921.—The coffee leaf-spot due to *Stilbella flavida* causes heavy losses in Porto Rico. In the higher altitudes with heavy rainfall defoliation results from the disease and many groves have been practically destroyed. An experiment was carried out on a portion of 1 of the plantations in which the disease was prevalent. In an area of about 2 acres all coffee trees were cut back to low stumps and all brush and weeds cleared out. Blank spaces were replanted. Bananas were planted around the edges of the plot to prevent the fungus from working in from adjoining infected trees. An effort was made to keep the area free of weeds, particularly those which were hosts of the fungus. The owners failed to carry out instructions as to weeding and even brought in diseased seedlings. Nevertheless, results were promising since at the end of nearly 4 years good yields were being obtained from the experimental plot in contrast to surrounding portions of the plantation, where yields were negligible.—*John A. Stevenson*.

649. MCCLINTOCK, J. A. Peach disease control. Georgia Agric. Exp. Sta. Bull. 139. 30 p., 6 fig. 1921.—The control of brown rot (*Sclerotinia fructigena* (Pers.) Nort.) on peaches is dependent upon the control of the curculio (*Conotrachelus nenuphar* Herbst.) as 90 per cent of the brown rot infections occur at curculio injuries. Mummied fruit left on trees and twig cankers are important sources from which conidia are disseminated in the spring. The blossom-blight form is the 1st indication of the disease in the spring. Blighted blossoms remain attached to the trees throughout the season and form sources of infection, and the growth of the fungus from the blighted blossoms into the twigs is one of the chief sources of canker formation and the wintering over of the disease. Thoroughly clearing the orchard after harvest coupled with spraying during the growing season will give effective control. Scab (*Cladosporium carpophilum* Thuem.) seems to be more serious on Belle than on Elberta. There seems to be little difference between dusting and spraying as to effective disease control. Calcium arsenate dusted on cotton in a young peach orchard caused serious injury to the young trees by burning the foliage.—*T. H. McHatton*.

650. MCCLINTOCK, J. A. Tomato wilt. Georgia Agric. Exp. Sta. Bull. 138. 12 p., 5 fig. 1920.—Tomato wilt (*Fusarium Lycopersici*), has discouraged the increase of tomato (*Lycopersicon esculentum*) acreage in Georgia. The fungus is widely spread in the Coastal regions and is becoming more so in the Piedmont section. The wilt generally attacks the plants when they are good sized and setting fruit, and is manifested by the yellowing and drooping of the leaves. Infected plants generally die within 10 days, but some remain alive until frost. Wilt resistant strains of tomatoes have been developed but these have not as yet proved safe and satisfactory. Investigations show that tomato wilt does not attack cotton, cowpeas, okra, and watermelons.—*T. H. McHatton*.

651. MAFFEI, LUIGI. La vaiolatura delle foglie dell' "Arachis hypogaea" Linn. dovuta a Cercospora. [Spotting of the foliage of *Arachis hypogaea* due to *Cercospora*.] Riv. Patol. Veg. 12: 7-11. 1922.—Dark chestnut-colored spots 1 cm. in diameter are caused on peanut leaves by a fungus that is named *Cercospora Arachidis* P. Henn. var. *macrospora* Maffei.—*F. M. Blodgett*.

652. MASSEY, L. M. Black-spot and mildew of roses. Amer. Rose Ann. 1922: 77-86. 1922.—Brief accounts of the life histories of *Diplocarpon Rosae* Wolf and *Sphaerotheca pannosa* (Wallr.) Lév. var. *Rosae* Wor. are given, together with recommendations for control.—L. M. Massey.

653. MEIER, FRED C., CHARLES DRECHSLER, and E. D. EDDY. Black rot of carrots caused by *Alternaria radicina* n. sp. Phytopathology 12: 157-166. Pl. 11, fig. 1-2. 1922.—A rather destructive storage rot of carrots (*Daucus carota* L.) has been found at various points in the eastern U. S. A. The rot seems to develop irrespective of the method of storage in pits, in mounds, or in cellars. It is characterized by a progressive softening and blackening of the tissues of the roots. Infection usually occurs at the crown and passes down through the root; but occasionally infection occurs at other points on the surface of the root. A fungus which proved to be a new species of *Alternaria* was isolated from the decaying tissue. When inoculated through wounds into healthy carrot roots, this fungus produced a rot identical in appearance with that from which it was originally isolated. Under very favorable conditions infection was also obtained on the leaves; but such leaf infection was never found in the field. Comparison of this fungus with *Macrosporium carotae* Ellis showed very marked differences in the size and form of the spores and also in the growth produced upon various media.—B. B. Higgins.

654. MONTEALEGRE, MARIANO R. Enfermedades del café. La maya o hilo blanco de las raíces. [Coffee diseases. White thread disease of the roots.] Bol. Camara Agric. Costa Rica 2: 193-201. 1922.—Coffee root disease has been serious in Costa Rica for many years. The fungi concerned have not been definitely determined. Carbon bisulphide and other treatments were found ineffective or so expensive as to be prohibitive. Lime-sulphur was finally tried and found effective when the solution was applied about the roots.—John A. Stevenson.

655. PEKLO, YAR. Na nové cesté. [On the new path.] Ochrana Rostlin 1: 7-9. 1921.—*Puccinia glumarum* is doing great damage to wheat. Ordinarily it reduces the crop by almost 20 per cent. In 1916 the reduction on the large estates was as high as 35 per cent, and on the peasant farms even 50 per cent. Breeding of resistant varieties is the only means of controlling this disease. It was found that the squarehead varieties are resistant but are too late for Czecho-slovakia. The author succeeded in isolating some varieties from the crosses between the domestic varieties and those from Svaler and Slovakia, which show more resistance to *P. glumarum*. A review of the literature on breeding of resistant varieties is given.—E. Baudyš.

656. PRITCHARD, F. J., and W. S. PORTE. Isaria rot of tomato fruits. Phytopathology 12: 167-172. Pl. 12, fig. 1. 1922.—A rot of tomato fruits, not previously described, has been found in the experimental grounds at Arlington, Virginia, and at Washington, D. C., during 1919, 1920, and 1921. This rot was produced by a fungus which is described as *Isaria clonostachyoides* n. sp. The fungus was grown upon various media and the chief characteristics of its growth recorded. Inoculations were made on both wounded and sound tomato fruits of various ages. Some infections were produced in all trials; but the percentage of infection was somewhat higher in wounded than in sound fruits. Very young and also ripe fruits were more readily infected and rotted faster than large green fruits. The fungus is not parasitic upon the leaves and stems of the tomato plant.—B. B. Higgins.

657. SALMON, E. S., and E. HORTON. Lime-sulphur and calcium caseinate as a fungicide. Jour. Ministry Agric. Great Britain 28: 995-999. 1922.—By tests conducted in the greenhouse it was determined that lime-sulphur at a strength of 1.003 sp. gr. (1 gallon of the concentrated solution (1.30 sp. gr.) to 99 parts of water), and containing 0.16 per cent of polysulphide sulphur, is lethal for the "powdery" conidial stage of the hop mildew (*Sphaerotheca Humuli* (DC.) Burr.) when the lime-sulphur is used with calcium caseinate in order to secure complete wetting of the fungus.—M. B. McKay.

658. SALMON, E. S., and H. WORMALD. Hop "canker" or "growing off." Jour. Ministry Agric. Great Britain 29: 354-359. 1 pl. 1922.—A disease of hops caused by *Fusoma parasiticum* is described in which typically 1 or more of the vines in a hill are killed by a cankering or eating away of the tissues at point of attachment to the rootstock. Generally the entire hill is not killed though cases have occurred where from 5 to 10 per cent of the hills in a garden have been completely killed.—Preventive measures listed are hard "cutting" or "dressing" of all hills in the affected part of the garden, grubbing up and destroying all dead hills, collecting and destroying all the cuttings from the hills in the affected part of the garden, and avoiding poor drainage.—M. B. McKay.

659. SMOLAK, YAR. Ochrana bramboru na poli. [Control of potato diseases in the field.] Ochrana Rostlin 1: 17-19. 1921.—Spraying with Bordeaux mixture is recommended for the control of diseases caused by *Phytophthora infestans* and *Alternaria Solani*, both of which are spread throughout the state.—E. Baudyš.

660. STRAŇÁK, FR. Fusariosa Žita. [Snow mold of cereals.] Ochrana Rostlin 1: 5-7. Fig. 1-2. 1921.—*Fusarium* may produce so much damage to cereals that it does not pay to harvest them. The development of the disease depends largely on weather conditions. It appears in epidemic form during certain summers and in certain regions. An account of the development of the pathogene is given. In experiments to control the disease fusariol and uspulum were mainly tested, the latter giving the better results.—E. Baudyš.

661. STRAŇÁK, FR. Rakovina bramboru. [Potato canker.] Ochrana Rostlin 1: 46-48. 1921.—The author gives the history of the appearance and world distribution of this disease. *Synchytrium endobioticum* was brought to Czecho-Slovakia from Germany in 1916. A description of the life history, symptoms, and damage done by the disease is given. In Czecho-Slovakia 91,434 hectares of soil are infected by the disease. Šluknovský County has been declared infected by the disease and is closed. In the infested soil, resistance of varieties is tested and it has been found that the most resistant varieties are Jubel, Roode Star I, Prefrent, Effect, Present, and Eigenheim.—E. Baudyš.

662. STUCKEY, H. P., and B. B. HIGGINS. Spraying peaches. Georgia Agric. Exp. Sta. Bull. 135. 91-101. 1919.—The following diseases, with means of control, are discussed: scab (*Cladosporium carpophilum*), brown rot (*Sclerotinia fructigena*), leaf curl (*Eriosea deformans*), and several insects, giving also spray formulas and applications.—T. H. McHatton.

663. TELLEZ, OLIVERIO. Una plaga en el estado de Jalisco. La "Pinta" o "Clavo" de la naranja y de la guayaba. [Anthracnose of orange and guava in Jalisco.] Rev. Agric. [Mexico] 6: 651-652. 2 fig. 1922.—*Gloeosporium Posidii* Delacr. causes anthracnose of the orange and guava. The use of Bordeaux mixture is recommended as a control measure.—John A. Stevenson.

664. TROST, JNO. F. Relation of the character of the endosperm to the susceptibility of dent corn to root rotting. U. S. Dept. Agric. Bull. 1062. 7 p., 2 pl. 1922.—Ears of seed corn of dent varieties characterized by starchy endosperm have been found to be infected with root-rot organisms more frequently than seed ears characterized by horny endosperm. In field tests the starchy seeds produce larger numbers of weaker plants which are more susceptible to root-rot.—J. T. Buchholz.

665. TROWBRIDGE, P. F. Report of the director, year ending June 30, 1921. North Dakota Agric. Exp. Sta. Bull. 159. 20-24. 1922.—Under "Biology," notes are given on black points of kernels, stem rust, scab, and "Helminthosporium blight," of wheat; on frost injury, wilt, and canker of flax; and on potato disease studies.—L. R. Waldron.

666. VIELWERTH, VL. O vlivu chemickýých mořidel na mazlavou sněť pšenickou. [The influence of treatment with chemicals on stinking smut of wheat.] Československý Zemědělec 2: 285-287. 1921.—Chemicals used in the control of the disease caused by *Tilletia Tritici* are divided into 3 groups, on the basis of whether they contain (1) copper, (2) formaldehyde, or (3) mercury. Copper sulphate does not kill the spores but only reduces their percentage of germination. Formalin and sublimate, on the other hand, kill the spores.—E. Baudyš.

667. WHITEHEAD, T. Varieties of swedes resistant to finger-and-toe. Jour. Ministry Agric. Great Britain 29: 362-368. 1922.—Two selections of Danish swedes resistant to the finger-and-toe disease (*Plasmidiophora Brassicae*) were tested in comparison with some British varieties susceptible to the disease. The results obtained seem to show that the 2 Danish varieties resist club-root to a marked degree and, in addition, keep better and have a higher feeding value than the remainder of the varieties included in the trial.—M. B. McKay.

668. YORK, HARLAN H., and WALTER H. SNELL. Experiments in the infection of *Pinus Strobus* with *Cronartium ribicola* (a preliminary statement). Phytopathology 12: 148-150. 1922.—Successful inoculations, under known conditions of temperature and humidity, on seedlings of *Pinus Strobus* with sporidia from the leaves of cultivated *Ribes nigrum* are reported. With an average temperature of 65°F. and a relative humidity of 94 per cent, sporidia developed on *Ribes* leaves in 5-6 hours, and infection of the pine needles occurred in 12½ hours after inoculation with the sporidia.—B. B. Higgins.

DISEASES CAUSED BY BACTERIA

669. DOOLITTLE, S. P. Comparative susceptibility of European and American varieties of cucumbers to bacterial wilt. Phytopathology 12: 143-146. 1922.—In comparable plantings of American and European varieties of pickling cucumbers it was found that all of the European varieties were much more susceptible to bacterial wilt than the American varieties.—B. B. Higgins.

670. GIROLA, CARLOS D. Agallas de corona del duraznero. [Crown gall of peach.] Bol. Ministerio Agric. Nación [Argentina] 26: 257-259. 1 pl. 1921.—Crown gall (*Bacterium tumefaciens* Erw. Sm. & Town.) of peach and its control are discussed.—John A. Stevenson.

671. LEE, H. A. Relation of the age of citrus tissues to the susceptibility to citrus canker. Philippine Jour. Sci. 20: 331-341. Pl. 1-4. 1922.—Experiments are presented in which fruits of *Citrus sinensis*, *C. nobilis* var. *unshiu* and *C. maxima* were inoculated at graduated stages in their maturity, from standard cultures of the citrus canker organism, *Pseudomonas Citri* Hasse. The experiments, carried over a length of 2 years, show that the period of serious susceptibility from a commercial point of view is 54 days or less for the unshiu oranges, 105 days or thereabouts for the Washington navel orange, and more than 135 days for the grapefruit varieties. The results show a very definite decrease in susceptibility of citrus tissues, both fruit and foliage, as they approach maturity. This is of very great importance in control work.—E. D. Merrill.

672. LEE, H. A., and A. SHINO. Citrus canker control experiments in Japan. Philippine Jour. Sci. 20: 121-151. Pl. 1-4, fig. 1. 1922.—Experimental work on the prevention of citrus canker upon the Washington navel variety of sweet orange, *Citrus sinensis*, is described. The following results were obtained by these methods: Copper sprays without other treatment reduced the number of fruits affected with citrus canker to as low as 34, 37, and 46 per cent. Untreated plots had percentages of cankered fruits of 80, 86, 92, and 96 per cent. The cost of these spray applications for the season was from 32.4 to 33.7 Japanese sen per tree. Lime-sulphur without other treatment reduced canker, but not to such an extent as did the copper sprays. The applications of this spray for the season cost 31 Japanese sen per tree. Formalin solution (1 to 100) did not reduce the canker. On the contrary, the trees sprayed with formalin had a very slightly larger percentage of cankered fruits than did the controls. The cost of

formalin sprays for the season was 1 Japanese yen per tree, or 3 times the cost of any of the other sprays. Spraying with copper sprays, accompanied by a removal of the sources of infection before the period of canker activity, reduced the canker percentage on treated plats to 9.25, 6.5, and 18.5 per cent. The cost of such treatments was 92 sen for Bordeaux 4-4-50 mixture, 90 sen for neutral Bordeaux mixture, and 92 sen for Burgundy 3-3-50 mixture.—Data are presented to show that wind prevention in itself may reduce citrus-canker development from 50 to 60 per cent to 6, 20, and 37 per cent. The injury by citrus canker to the Washington navel orange is described in detail. It seems reasonable to conclude that, in countries where citrus canker is already widespread or universal, a feasible control may be obtained upon citrus fruits of the general susceptibility of the Washington navel.—*E. D. Merrill.*

673. McLEAN, F. T., and H. A. LEE. Pressures required to cause stomatal infections with the citrus-canker organism. *Philippine Jour. Sci.* 20: 309-321. *Fig. 1-2.* 1922.—A method is outlined for applying measurable pressure to *Citrus* leaves and determining by this means the pressures necessary to cause penetration of such tissues by water. Tests of the injection pressures of *Citrus* leaves gave the following results: The average pressure for Pernambuco grapefruit was 19.5 cm. of mercury; seedling East Indian pummelo, 19.6; Washington navel orange, 20.8; and Szinkom mandarin orange, 33.6. The average injection pressures of the above 4 varieties are directly proportional to their canker resistance, as shown by field observations. Leaves of Szinkom mandarin orange, a resistant variety of *Citrus*, and seedling grapefruit and pummelo trees, both very susceptible, were tested for their resistance to the entrance of canker organisms applied in water under pressure. Szinkom mandarin orange leaves were resistant to canker infection by immersion, and up to pressures of 10 cm. of the mercury column. With high pressures numerous cankers developed in leaves of this variety. Grapefruit and pummelo leaves developed canker readily by immersion without added pressure. The pressures necessary to cause canker infection were thus in agreement with the degree of observed field resistance of the sorts tested. The results obtained strongly substantiate the theory previously advanced that structural differences in the stomata constitute one cause for the differences in susceptibility of the mandarin orange and the grapefruit and pummelo varieties. In the mandarin orange apparently the structure of the stomata prevents the ingress of surface water; in the grapefruit the stomatal structure is such as to allow the ingress of surface water which thus affords a medium of entrance for the canker bacteria. The results definitely indicate that the resistance of the mandarin orange is due to mechanical structural differences.—*E. D. Merrill.*

674. PAINE, SYDNEY G., and MARGARET S. LACEY. Chocolate spot disease or streak disease of broad beans. *Jour. Ministry Agric. Great Britain* 29: 175-177. 1 *pl.* 1922.—The chocolate spot or streak disease of broad beans caused by *Bacillus Lathyri* occurred as a serious epidemic in many counties and was very general throughout a large part of England and Wales in 1920. The apparent spread of the disease seemed to suggest wind dispersal of the causative organism. The causal organism is carried on the seed of winter beans, and especially on those bored by the bean beetle, *Bruchus rufimanus*. In its attacks on the young pod this beetle may inoculate the plant at the time of egg-laying and the young larvae may infect the seed when they bore their way in.—Measures of control suggested are to dress the land well with potash, reject seed showing an excessive amount of boring by beetles, and sterilize the seed by soaking for 10 minutes in weak lysol or formalin or by dressing with one of the tar preparations supplied for the purpose.—*M. B. McKay.*

675. WELLES, COLIN G., and EMILIANO F. ROLDAN. Solanaceous wilt in the Philippine Islands. *Philippine Agric.* 10: 393-398. *Pl. 1-3.* 1922.—The authors report studies on *Bacterium Solanacearum* E. F. Smith which is known to cause serious disease of tomato, tobacco, and egg-plant in the Philippines. Egg-plants appear somewhat resistant and may be grown successfully if planted during the rainy season so that maturity will be reached early in December. A description of the disease on tomato, tobacco, egg-plant, and castor bean is given. *Chrysanthemum coronarium* is attacked by a similar, if not identical, organism.—*Sam F. Trelease.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

676. EYER, JOHN R. Notes on the etiology and specificity of the potato tip burn produced by *Empoasca mali* LeBaron. *Phytopathology* 12: 181-184. *Pl. 14, fig. 1.* 1922.—Continuing a study of the demonstrated relation of the potato leafhopper (*Empoasca mali* Le B.) to a certain form of the tip burn of potato (*Solanum tuberosum* L.) leaves, an attempt has been made to determine the nature and the transmissibility of the substance injected into the leaves by the leafhopper. Inocula were prepared by macerating either nymphs or the adult leafhoppers in sterile water or in 10-70 per cent alcohol. This extract was injected, with a small hypodermic needle, into the midrib of growing potato leaves. Into other leaves similar quantities of water or alcohol were injected to serve as checks. The leaves inoculated with leafhopper extract developed typical tip burn, while the checks remained healthy. The extract from nymphs was more virulent than that from adult insects. Extracts prepared from other species of sucking insects failed to produce tip burn. Direct sunlight was not necessary for the development of tip burn, though heavy shade retarded the development of the disease.—*B. B. Higgins.*

677. GOODEY, T. On the susceptibility of clover and some other legumes to stem-disease caused by the eelworm, *Tylenchus dipsaci*, syn. *Devastatix*, Kühn. *Jour. Agric. Sci.* 12: 20-30. *Pl. 1, fig. 1-2.* 1922.—After a brief review of the literature, the parasite and the disease are described. The term stem-disease corresponds to the German term *Stockkrankheit* and should be retained although the name stem-rot applied to the disease caused by *Sclerotinia Trifoliorum* may be somewhat confusing. Symptoms of the 2 diseases are compared. Preliminary inoculation with single eggs containing well developed larvae showed that mature and sexually differentiated worms are developed in 24-30 days after inoculation. Other experiments showed that red clover is very susceptible to attack. For the main experiments, seed of 4 varieties of red clover, 2 of cow grass, 2 of alsike clover, and 5 of white clover were sown in pots in heavily infested soil. Seed of kidney vetch, sainfoin, lucerne (Provence), and trefoil were also used. After 37 days all seedlings were harvested and healthy and diseased plants preserved separately. Data were secured from this material on the percentage of infection, and by means of counts from infected plants an idea of the intensity of infection was obtained. The plants used were found to be separable into 4 groups: group 1, including the red clovers, Swedish cow grass, and kidney vetch, was very susceptible; group 2, including English cow grass and 2 varieties of alsike, was very much less susceptible; group 3, including sainfoin and 3 varieties of white clover, was only slightly susceptible; and group 4, including lucerne, trefoil, and Sutton's Mammoth white clover, was entirely resistant. Canadian red clover was found to be much more susceptible than other species of red clover. The author concludes that to avoid stem-disease it is advisable not to sow red clover, cow-grass, or Alsike clover, but rather trefoil, lucerne, or a large white clover.—*V. H. Young.*

678. WEISS, H. B., and E. WEST. Notes on the dodder gall weevil, *Smicronyx sculpticollis* Casey. *Ohio Jour. Sci.* 22: 63-65. *1 fig.* 1921.—Galls on *Cuscuta Cephalanthi* Eng. produced by the weevil are described.—*H. D. Hooker, Jr.*

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

679. ANONYMOUS. Mosaic disease-susceptible and immune varieties. *Jour. Jamaica Agric. Soc.* 25: 427-429. 1921.—This is a discussion of cane varieties immune and susceptible to the mosaic disease, based on work carried out in Porto Rico with the variety Kavangire.—*John A. Stevenson.*

680. ARTSCHWAGER, E. Occurrence of phloem necrosis in leafroll tubers. *Phytopathology* 12: 193-194. 1922.—Potato (*Solanum tuberosum* L.) plants of long leafroll lineage have been observed to produce tubers and stolons which show severe phloem necrosis. When tubers showing only slight symptoms of necrosis were planted the necrotic tissue increased as the tubers began to sprout. It developed near the eyes from which sprouts were growing irre-

spective of the position of the eye on the tuber, showing that necrosis is linked with growth activity.—*B. B. Higgins.*

681. BARRUS, MORTIER F., and CHARLES C. CHUPP. **Yellow dwarf of potatoes.** *Phytopathology* 12: 123-132. *Pl.* 7-8, *fig.* 1. 1922.—A disease of Irish potatoes (*Solanum tuberosum*), thought to be new to science, has recently been recognized in several counties of New York State. The leaves of the diseased plants have a yellow color, and toward the tops of the plants the leaflets show a tendency to roll. The stems are stocky but decidedly dwarfed. When sectioned they show numerous brown specks in the cortical tissue, especially in the upper nodes. Such plants produce a few irregular tubers which are usually cracked. When sectioned the tubers also show the brown specks in the cortical tissues. The disease is apparently transmitted through the soil and also by some agency above the soil, but the cause of the disease and the exact method of its transmission have not been determined.—*B. B. Higgins.*

682. COOK, MEL. T. **The dissemination of peach yellows and little peach.** *Phytopathology* 12: 140-142. 1922.—It has been found that peach yellows and little peach may be transmitted to healthy trees by inserting a bud from a diseased tree, even though the bud may fail to grow. They may be transmitted also by inserting a piece of bark from a diseased tree; but attempts to infect healthy trees by injecting juice from diseased trees have failed. The length of the incubation period may be 1-4 years, depending upon the severity of the disease in the tree from which the bud was taken. A bud taken from an inoculated tree during the incubation period may transmit the disease. Trees from which buds are to be taken for nursery work should have been under previous observation for at least 4 years.—*B. B. Higgins.*

683. COTTON, A. D. **Potato leaf curl demonstrations.** *Jour. Ministry Agric. Great Britain* 28: 1019-1021. 1922.—Comparative demonstrations of the cropping qualities of healthy and leaf-curl or leaf-roll diseased seed potatoes were conducted in 1921 in 10 widely separated localities. The healthy seed came from a field free from disease. A 2nd lot of seed was from a field a few miles distant which was generally, though slightly, affected with leaf curl. The seed affected with leaf curl yielded on the average only about $\frac{1}{2}$ as much as healthy seed.—*M. B. McKay.*

684. FAWCETT, GEO. L. **Las primer as investigaciones sobre el mosaico en Java.** [The first investigations on mosaic in Java.] *Rev. Indust. Agric. Tucumán* 11: 121-123. 1920.—The author reviews the work of Kobus and Wilbrink-Ledeboer who first studied the mosaic disease of sugar cane in Java. The author's experiments confirm their conclusion that plants grown from true seed obtained from diseased plants are free from the disease. Their idea that the disease is merely a vegetative variation has of course been definitely disproved.—*John A. Stevenson.*

685. FAWCETT, GEO. L. **Notas sobre la extirpación del mosaico de la caña.** [Notes on the eradication of the cane mosaic.] *Rev. Indust. Agric. Tucumán* 11: 74-76. *Fig.* 1-2. 1920.—The author divides sugar cane varieties into 3 classes with respect to their behavior toward the mosaic disease: (1) immune varieties, represented by Kavangire; (2) resistant varieties, including a number of the Javan seedlings; (3) susceptible varieties. The native varieties of Tucumán fall in the last class although some are superior to the resistant types in sucrose and lack of fiber. In the experimental plots of the experiment station an attempt was made to combat the disease by roguing out all diseased stools. Although these plots were isolated from other cane nearly all stools showed the disease. Apparently there is no hope for the susceptible varieties.—*John A. Stevenson.*

686. HUNGERFORD, CHAS. W. **Leaf roll, mosaic and certain other related diseases in Idaho.** *Phytopathology* 12: 133-139. *Pl.* 9. 1922.—In Idaho both leaf roll and mosaic have gradually increased in severity and extent since first noted in 1919. Comparable plantings of potatoes from healthy and from diseased plants have shown that these diseases may cause

heavy loss in yield.—In "Russett dwarf," similar to certain types of mosaic, the diseased plants are much dwarfed and from a distance their yellowed leaves present a very rusty appearance. In more advanced stages the leaves drop off, beginning at the bottom of the plant. Dark brown streaks appear on the leaf petioles and on the lower part of the stems. The yield is reduced $\frac{1}{2}$ – $\frac{3}{4}$. The disease is infectious and is transmitted as is mosaic.—A condition known locally as "Calico" seems to be inherited but is not infectious and is not considered a serious malady.—*B. B. Higgins.*

687. PERRET, CL. Sur les maladies des pommes de terre. [Potato diseases.] Ann. Épiphyties 7: 304–314. 1921.—Germination of tubers on trays shows up spindle sprout ("filosite") but not phloem necrosis or mosaic. A nitrogenous fertilizer does not cure phloem necrosis and mosaic but it masks the symptoms. Experiments have demonstrated the prominent rôle played by sound tubers in potato production. The effect of nitrogenous fertilizers on the vegetative growth of the Andrea variety was very clear; that of a radio-active fertilizer was very slight but the crop was increased. Under the action of extra intensive manuring the plants grew luxuriantly. Nevertheless, leaf roll symptoms were visible at the end of the season on the Andrea variety, the yellow mosaic spots were very apparent on the Violette du Forez, and the number of dwarf plants with seed tubers preserved was considerable. The variety Violette du Forez which has existed in the province of the Loire for over 50 years has slowly lost a part of its characteristic stability, and the process of decline has been rather definite. The incurvation of the leaves does not occur, but one sees in the field numerous missing plants, a backward crop, and many dwarf plants with seed tubers preserved; also, plants with a single stem only, with the yellow spots on the leaves and with here and there some signs of leaf curling. This trouble is probably a leaf roll or mosaic degeneration. At altitudes of 850–1100 m. the regularity of the fields is greater than in the lower regions (650–850 m.). The method of keeping potatoes appears to exercise a certain influence on the process of degeneration.—In the varieties affected with phloem necrosis the author has followed the progress of the degeneration during the years 1918–1920. A table shows very clearly the progress of the leaf roll and the favorable effect of good meteorological conditions on the yields.—The important symptoms of phloem necrosis which accompany the considerable reduction in yield are as follows: (1) Incurving of the leaves appearing early and at the lower part of the plant. (2) Incurvations later becoming general in nearly all of the leaves. (3) Agglomerations of tubers at the base of the stalk. (4) Preservation of the seed tuber in the ground, even in moist seasons, in at least 30 per cent of cases. The preservation of the seed tuber is observed also in the varieties with mosaic, and in dwarf plants. The decline of strains of potatoes assumes 3 main forms in the Loire: (a) The phloem necrosis form, frequent in the varieties Institut de Beauvais, Merveille d'amérique, and Bimel. (b) The form associated with mosaic and missing plants, the type which has been chiefly included under mosaic without definite correlation with spindling sprout ("filosite") and which has been observed in Violette de Paris and Saucisse de Paris. (c) Mixed forms participating in the 2 preceding; there may be the leaf roll symptoms, dwarf stalks, and sometimes missing plants, as observed in Anglaise, and Fin de Siècle. Preservation of the seed tubers in the ground occurs in these 3 forms. The size of the crop and percentage of dry matter are diminished and the content in nitrogenous material is increased in the tubers.—*Phytophthora infestans* is not to be considered as a cause of degeneration.—The progeny of a plant with phloem necrosis shows leaf roll symptoms. A plant appearing healthy, but growing among other plants with leaf roll, may produce either sound or leaf roll progeny. There are no immune plants; those appearing immune are only accidentally non-infected. Growing of seed potatoes in other localities exercises a beneficial action on the yields and has a rejuvenating effect on the variety; but such methods do not eradicate mosaic, leaf roll, or spindling sprout ("filosite").—The author considers the measures necessary to protect French strains from degeneration diseases.—*E. Fœx.*

688. POOLE, R. F. Celery mosaic. Phytopathology 12: 151–154. Pl. 10, fig. 1. 1922.—During the season of 1921 a stunted and malformed condition of celery (*Apium graveolens*) was noted in 2 localities of New Jersey. This condition was found to be due to an infectious

mosaic which could be transferred from diseased to healthy plants by means of aphids (*Myzus persicae*). There were some indications that the celery plants became infected from mosaic in nearby tomato plants.—*B. B. Higgins*.

NON-PARASITIC DISEASES

689. ADAMS, J. F. Observations on frost protection and drought spot of apple. *Phytopathology* 12: 184-187. *Fig. 1.* 1922.—During the spring of 1921 late frost so injured the apple crop in Delaware that the yield for the state was reduced to 12 per cent of normal. However, 1 orchard was noted in which a normal yield was produced. Inquiry brought out the fact that some charcoal furnaces on the windward side of this orchard produced a smudge that undoubtedly protected the fruit from frost. During the summer the York Imperial apples in this orchard showed considerable drought spot. Counts made Aug. 1 showed 5 per cent injury; but a month later the more seriously affected fruits had dropped so that counts at that time showed only about 1 per cent of diseased fruit. A long dry spell during early summer together with unfavorable soil conditions apparently brought on the disease.—*B. B. Higgins*.

690. FIROR, J. W. Winter killing of fruit and nut trees. *Georgia State Coll. Agric. Circ.* 60. 4 p., 1 fig. 1920.—This reprint contains a general discussion of winter injury on fruit trees in Georgia with suggestions concerning maturing of trees before frost, mounding in late fall, and using whitewash and cover crops for protection.—*T. H. McHatton*.

691. GLEISBERG, W. Hagelschäden bei Bohnen-Keimpflanzen. [Injury to bean seedlings by hail.] *Illustr. Landw. Zeitg.* 42: 184-185. *Fig. 1-2.* 1922.—By experiment it is shown that bean seedlings may be deprived of various important organs such as the cotyledons or the plumule and still bear as good crops as normal plants. The details attending the recovery of the plants are given.—*John W. Roberts*.

692. LINSBAUER, L. Ueber eine Stoffwechselerkrankung an Apfelfrüchten und deren Heilung. [A physiological disease of apple fruits, and its cure.] *Zeitschr. Pflanzenkr.* 32: 1-17. 1922.—The author describes a peculiar malformation of apples of the variety Edelrot from the Southern Tyrol. The typical fruit of this variety averages 60-65 mm. by 60-64 mm., and the weight varies between 110 and 114 gm. Larger specimens are very regularly spherical-oblong; smaller specimens are blunt cone-shaped towards the stem end. Around the stem itself the fruits are flattened. The curve of the surface is uniform, tapering toward the calyx end. The skin is finely glossy and light greenish-yellow, later becoming yellowish-white like wax.—The fruits from affected trees are on the average smaller and inferior in shape. The average weight of an abnormal apple was 42 gm. as compared with 106 gm. for the normal fruit. Affected apples often appear laterally undeveloped toward the calyx end, becoming more pointed than typical ones. The skin of the diseased fruit shows, usually toward the calyx end, shiny, chestnut-brown, sharply defined areas which become confluent and in consequence of which there is a one-sided growth. At times the smaller fruits are covered by a brown, scabby crust with cracks, which no doubt contributes to the deficiency of sap within the fruits.—With the exception of the fruits, affected trees appear normal. The trees are well cared for, especially as regards spraying, etc. The soil is a sandy loam 40-80 cm. in depth underlain by "Bach schotter" (gravel?), and is described as very good. Every 8-14 days the trees are watered. In consequence of early applications of night-soil the trees have made a luxuriant growth, and the owner is inclined to attribute to this manuring process the development of the malformed fruit.—Apparently the most vigorous trees suffered most, while weak trees never developed the trouble.—The author determined the losses due to transpiration during a 24-hour period and found that the loss from transpiration was less in normal than in abnormal fruits. Transpiration, however, was greater in the larger specimens of both normal and abnormal fruits. Chemical analysis revealed a higher water content in the sound fruits, together with a corresponding decrease in dry substance. The sound fruits were higher in nitrogen compounds. The disease in some instances caused a 50 per cent loss in the crop.—

Unfavorable composition of the mineral nutrients available to the trees is suggested as possibly responsible for this malformation of the fruits. Fertilizer experiments conducted on hay in the affected orchards showed beneficial results from acid phosphate, which gave almost double the return.—Experiments were now tried to test the effect of suitable fertilizers on the development of the fruits. Fifteen affected trees were divided into 3 plots. The 1st received no treatment (check); the 2nd, potash and lime; the 3rd, basic slag and 18 per cent superphosphate. At the end of the experiment the trees in plot 1 were freely affected. The potash and lime plot showed no change for the better. The trees receiving acid phosphate, however, showed a remarkable improvement, and in the bearing trees no sign of the trouble was noted. In the abnormal fruits the nitrogen content sinks to a minimum, but this content becomes increased after the potash-lime application. In the fruits from trees treated with phosphoric acid, however, the nitrogen content was equal to that of the normal fruits.—The conspicuous effect of phosphoric acid may be regarded as a fact, but this does not explain the remarkable results. It would seem premature to attribute to the phosphoric acid a specific rôle in the development of the fruit. That the phosphoric acid in the soil had diminished owing to the practice of overfertilizing with nitrogen for many years is apparent from the experiments with the orchard hay. It is argued that the supply of phosphoric acid has increased the capacity of the trees to make use of potash. Apparently it has really been the potash to which should be credited the normal development of the fruits. The author states that further careful experiments and analyses would no doubt throw considerable additional light on the subject.—*H. T. Güssow.*

DISEASES OF UNKNOWN CAUSE

693. BROWN, J. G., and FREDERICK GIBSON. Some observations on alfalfa girdle. *Phytopathology* 12: 188-190. *Pl. 15.* 1922.—A serious disease of alfalfa (*Medicago sativa* L.) known as "Girdle" has been under observation in the southwestern part of the U. S. A. since 1912, but the cause of the malady has never been determined. Recently, similar girdles have been observed on several other species of plants in this region. In 1 case a scale insect (*Coccus hesperidum* L.) was found associated with the girdle. It seems probable that the scale is connected with the disease as a carrier of the causal organism, or otherwise.—*B. B. Higgins.*

694. CHANDLER, S. E. The brown bast disease of the Para rubber-tree. *Nature* 109: 357-360. 1922.—A review of 6 recent publications is made.—*O. A. Stevens.*

695. FAWCETT, GEO. L. Notas preliminares sobre una enfermedad del tabaco. [Preliminary notes on a tobacco disease.] *Rev. Indust. Agric. Tucuman* 12: 5-17. *Fig. 1-14.* 1921.—The most serious disease of tobacco in Tucuman province of Argentina is that known as "Corcova," a term descriptive of the form taken by diseased plants. Black lines somewhat resembling insect galleries develop on both surfaces of the leaves and on the stems; these areas may coalesce. Affected portions of leaves become yellow in color, and finally wither and droop. Partial recovery is sometimes noted during periods of dry weather. The continued growth of unaffected portions of leaves causes a characteristic curling or distortion. Insects are not responsible nor has it been possible to connect fungi with the disease as causative agents. Bacteria found in connection with the lesions of advanced cases failed to reproduce the disease. Certain varieties (Turco and Criollo in particular) are less subject to the disease than others. Early plantings show less of the disease than late plantings. Spraying with Bordeaux or sulphur compounds gave uniformly negative results.—*John A. Stevenson.*

696. GIRARDI, J. Durazneros. Manchas en las frutas. [Fruit spot of peach.] *Defensa Agric. [Uruguay]* 3: 55-56. 1922.—A fruit rot and leaf spot (cause not determined) has attacked peaches. Control measures are suggested.—*John A. Stevenson.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

697. BAUDYŠ, E. Význam ochrany rostlin pro zemědělství. [Importance of plant disease control for agriculture.] *Ochrana Rostlin* 1: 3-5. 1921.—Crop production is now $\frac{1}{3}$ - $\frac{2}{3}$ of

that before the war. The reasons for this state of affairs are the lack of some of the mineral nutrients, mainly calcium, phosphorus, and potassium, and the inferior human force. Lack of mineral nutrients favors the spread of some diseases. The unusual spread of rust (*Puccinia graminis*) is attributed to the lack of calcium and phosphorus.—The most destructive disease of cereals is that caused by *Fusarium nivale*. Detailed estimates show that this disease causes damage to the extent of about 40 per cent. It can be controlled by sublimate, uspulum, or by breeding resistant varieties. The author observed that not all varieties are equally susceptible to this disease. Take-all disease, caused by *Ophiobolus* and *Leptosphaeria herpotrichoides*, was scarcely known before the war; now it reduces the crop by about 5–10 per cent. The spread of this disease is attributed to late plowing of the stubble field. *Helminthosporium* may reduce the crop of oats and barley by about 30 per cent. Smut reduces the crop of wheat and of oats each by about 10 per cent. Corn smut reduces that crop by 15 per cent. About 10 per cent of the potato crop is destroyed by black leg, and the damage done by all potato diseases is about 30 per cent. The conclusion is drawn from these data that disease control is very important for agriculture.—*E. Baudyš*.

698. BRAUN, HARRY. Effect of delayed planting on germination of seed wheat treated with formalin. *Phytopathology* 12: 173–180. *Pl. 13, fig. 1–3*. 1922.—A comparison of the injury produced by the ordinary formalin treatment and by the pre-soak formalin treatment was made with 5 varieties of wheat. One set of a quart of each variety was dipped for 30 minutes in a solution of 1 part formaldehyde to 320 parts water, drained, and covered for 1 hour. Another set was treated in the same way except that the seed were dipped 10 minutes in water, drained, and covered 5½ hours before dipping into the formalin solution. All were then spread out to dry. At the end of 24 hours and again at the end of a week 300 seed were counted from each lot and planted in pots in the greenhouse along with a similar lot of untreated seed. There was some injury to the seed treated by the ordinary formalin method and the injury increased in most cases when the seed were held for 1 week. With seed treated by the pre-soak method there was no injury. In most cases there was an increase in the per cent of germination and a marked stimulation of growth.—*B. B. Higgins*.

699. BROWNING, C. H., J. B. COHEN, and R. GULBRANSEN. The antiseptic properties of cyanine dyes. *British Med. Jour.* 3196. 514–515. 1922.—The results of recent tests on the cyanine group of dyes concerning their antiseptic properties show: (1) certain of the cyanine dyes are extremely potent antiseptics—for example, sensitol red for staphylococci in watery medium; (2) selective antiseptic action as between staphylococcus and *B. coli* is exhibited to a higher degree by certain of these dyes—for example, sensitol red—than by any other compound hitherto investigated, the ratios of the sterilizing concentrations probably being greater than 2,000 to 1 (with crystal violet the ratio is 500 to 1); and (3) sensitol green is the most active of these dyes both in serum and watery medium for *B. coli*. Also, in the case of *B. coli* the antiseptic action in serum is more intense than in water medium.—[*Through Public Health Engineering Abstracts*.]

700. CHASE, W. W. The principal parasites of the peach. *Georgia State Bd. Entomol. Bull.* 57. 46 p., 10 pl. 1920.—Besides a discussion of several insects life histories are given and methods of control for brown rot (*Sclerotinia fructigena* Schroet.), crown gall (*Pseudomonas tumefaciens*, E. F. S. & Town.), peach scab (*Cladosporium carpophilum*), peach leaf curl (*Exoascus deformans* (B) Fuckel). The bulletin concludes with a discussion of concentrated lime-sulphur and the management of peach orchards.—*T. H. McHatton*.

701. DIX, WALTER. Beizapparate. [Apparatus for the treatment of seed.] *Illus. Landw. Zeitg.* 42: 84–86. *Fig. 93–96*. 1922.—Detailed descriptions, with drawings, are given of elaborate apparatus for use in the fungicidal treatment of seed grains.—*John W. Roberts*.

702. GIROLA, CARLOS D. Sobre algunas enfermedades de la papa. [Concerning some potato diseases.] *Bol. Ministerio Agric. Nación [Argentina]* 26: 260–264. 2 fig. 1921.—Brief descriptions are given of rosette (*Corticium vagum* B. & Curt. var. *Solani* Burt.) and scab (*Actinomyces scabies* Thaxter). Control measures are outlined.—*John A. Stevenson*.

703. LEK, H. A. A., VAN DER. Over den invloed van enting en bastaardeering op de vatbaarheid voor parasitaire aantastingen. [The influence of grafting and hybridisation on the susceptibility to diseases.] *Tijdschr. Plantenz.* 27: 124-128. 1921; 28: 1-14, 37-45, 97-103. 1922.—The writer points out first the difference between grafting and hybridisation; that in the 2nd case a new set of characters is being formed while in the 1st the existing characters are only modified more or less through the surrounding environment. After giving numerous examples of such modifications and of the relation between the stock and scion he points out the influence of the understem on the longevity of the grafted trees; that this is greatly decreased and that the period of degeneration and decline in vigor, during which the plants become susceptible to diseases, comes much earlier than in the case of ungrafted trees. In some cases the modifications brought about through grafting may be a thickening of the cuticle and changing of the hairiness; in other cases the chemical composition of both the plants (components) is materially changed. All this can influence the resistance of the plants to diseases. The nature of immunity of plants to diseases is also briefly discussed and the importance of the changes in the periodicity of plants as affecting their resistance to diseases is pointed out. The question of chimeras is then discussed and the somewhat unsatisfactory results obtained with plant chimeras in connection with obtaining disease resistant varieties are treated. The latter fail to throw any light on the possible changes in the physiological properties of the plants through the mutual influence of the components, as has been noticed on grafted plants, which may play some rôle in increasing the resistance to diseases, be this real or only apparent. The writer shows through numerous examples that the stem and the scion do not change each other's resistance to diseases and emphasizes the importance of selection of stocks resistant to root diseases and insects, which he thinks will play a considerable rôle in the propagation of cultivated woody plants.—*D. Atanasoff.*

704. McHATTON, T. H., and J. W. FIROR. Spray calendar for Georgia. Georgia State Coll. Agric. Bull. 220. 1½ p., 3 fig. 1920.—Spray schedules and formulas for fruits and vegetables are given.—*T. H. McHatton.*

705. MONTEMARTINI, LUIGI. L'applicazione degli articoli 6 e 7 della Convenzione internazionale di Roma 4 marzo 1914 contro le malattie delle piante. [The application of articles 6 and 7 of the international convention of Rome, March 4, 1914, against the diseases of plants.] *Riv. Patol. Veg.* 12: 1-6. 1922.—The difficulties of an effective inspection at ports of entry are discussed together with the need of a better and more complete organization of internal plant inspection service.—*F. M. Blodgett.*

706. MOREL, A., et A. ROCHAIX. Action microbicide par contact de quelques essences végétales à l'état liquide. [Bactericidal action of certain plant essences in liquid state.] *Compt. Rend. Soc. Biol.* 86: 933-934. 1922.—The essences of thyme, citron, juniper, and mint were found to possess bactericidal action on meningococci, staphylococci, diphtheria bacilli, and Eberth's bacillus.—*S. Morgulis.*

707. REINKING, OTTO A. Citrus diseases of the Philippines, Southern China, Indo-China, and Siam. *Philippine Agric.* 9: 121-179. Pl. 1-14. 1921.—The paper is divided into 6 sections, 1 for each region, 1 for control measures, and a summary compiled on the basis of the hosts. A description of the diseases, a discussion of the causal organisms, and suggestions regarding control measures are given. The study was made in collaboration with the U. S. Bureau of Plant Industry, and involved considerations of importance in connection with shipments of citrus varieties to the U. S. A. The following list gives the organisms associated with Citrus, many of these organisms being pathogenic: *Aleurocanthus citripertus* Q. & B., *Aschersonia aleyrodis* Webb., *A. sclerotioides* P. Henn., *Aspidiotus cocotiphagus* Marlatt, *Auricularia polytricha* Sacc., *Chrysomphalus aurantii* Mask., *C. aonidium* L., *C. dictyospermi* Morg., *Cladosporium Citri* Masee, *C. herbarum* (Pers.) Link, *Coccus hesperidum* L., *C. mangiferae* Green, *C. viridis* Green, *Colletotrichum gloeosporioides* Penzig., *Corticium salmonicolor* B. & Br., *Crinipellis galeatus* Pat., *Cyathus Montagnei* Tul., *Cystospora aberrans* Sacc.,

Daldinia concentrica Cas. & de Not., *Diaporthe citrincola* Rehm, *Diplodia Aurantii* Catt., *Dolichoderus*, *Duportella tristiuscula* Pat., *Eutypa heteracantha* Sacc., *Eutypella citricola* Speg., *Fiorinia theae* Green, *Fomes applanatus* Pers., *Ganoderma australe* Pat., *Gloeosporium intermedium* Sacc., *Heterochaete tenuicula* Pat., *Hypoxyton atropurpureum* Fr., *H. serpens* (Pers.) Fr., *Lepido saphes beckii* Newm., *L. gloverii* Pack., *Loranthus ferrugineus* Roxb., *L. parasiticus* (L.) Merr., *L. pentandrus* L., *L. philippensis* Cham. & Schlecht, *Massarina raimundoi* Rehm, *Meliola citricola* Syd., *Microcera coccophila* Desm., *Mucor*, *Myriangium duriae* Mont., *Nectria episphaeria* (Tode.) Fr., *Nummularia citrincola* Rehm, *Oecaphylla smaragdina* Far., *Ozonium auricornum* Lk., *Parlatoria brasiliensis* n. sp. Ms., *P. pergandii* Comst., *P. proteus* Curt., *P. ziziphus* Lucas, *Penicillium*, *Peroneutypa heterocantha* Sacc., *Pheidalogeton*, *Phoma*, *Phyllocnistis citrella* Stainton, *Phyllosticta circumsepta* Sacc., *Phytophthora*, *Polyporus caryophylla* Racib., *P. hirsutus* Fr., *P. Rickii* Pat. var. *philippinensis* Pat., *Polystictus flavus* Jungh., *Pseudoauidia trilobiformis* Green, *Pseudomonas Citri* Hasse, *Pulvinaria*, *Rhizoctonia*, *Rhytidopeziza rufula* Bres., *Saissetia*, *Schizophyllum commune* Fr., *Sclerotium*, *Septobasidium albidum* Pat., *S. carbonaceum* Pat., *S. leucostemum* Pat., *S. Reinkingii* Pat., *Termes*, *Traversoa dothiorelloides* Sacc. & Syd., *Trybliidiella mindanaensis* P. Henn., *Ulsaria Citri* Rehm, *Xylaria castorla* Berk., *Zignoella nobilis* Rehm.—S. F. Trelease.

708. REINKING, OTTO A. Notes on diseases of economic plants in Indo-China and Siam. Philippine Agric. 9: 181-183. 1921.—A host index is given of 50 diseases for plants other than citrus. The following are listed among the pathogens: *Aithaloderma claratisporum* Syd., *Cercospora batatae* Zimm., *Cercospora Henningsii* Allesch., *C. Nicotianae* Ell. & Ev., *C. vaginae* Kr., *Cercosporina ricinella* (Sacc. & Berl.) Speg., *Dictyothyriella mucosa* Syd., *Hemileia vastatrix* B. & Br., *Macrophoma Musae* (Cke.) Berl. & Vogl., *Meliola mangifera* Earle, *Mycosphaerella gossypina* (Cke.) Atk., *Pestalozzia palmarum* Cke. & Grev., *Phytophthora faberi* Maubl., *Pseudoperonopora cubensis* (B. & C.) Rost., *Puccinia longicornis* Pat. & Hor., *Sclerospora*, *Sclerotium*, *Uredo Fici* Cast.—Sam F. Trelease.

709. ROSAM, V. O ochraně porostu proti chorobám a škudcům. [Control of plant diseases and insects.] Ochrana Rostlin 1: 2-3. 1921.—The author discusses the importance of control of plant diseases and insects for agriculture. The damage done by the plant diseases is greater than that done by the animal parasites. The present organization of phytopathological work is not sufficient. The suggestion is made to provide a law on the control of plant diseases, to organize work in the control, and to establish phytopathological stations. The propaganda should be conducted by means of leaflets, lectures, practical demonstrations, and moving pictures. Money could be obtained by taxing seed producers and plant breeders.—E. Baudyš.

710. SCHOEVERS, T. A. C. Ziekten en beschadigingen van tomaten. [Diseases and injuries of tomatoes.] Tijdschr. Plantenz. 28: 67-93. Pl. 1-4. 1922. [Also in Verslag. en Mededeel. Plantenziektenk. Dienst Wagenigen 26. 26 p. 1922.]—The following diseases and injuries of the tomato plant observed in Holland and remedies against them are briefly described: wire worm, *Oniscus*, *Verticillium albo-atrum*, *Rhizoctonia*, canker (*Diplodina* (*Didymella*) *Lycopersici*), *Sclerotinia libertiana*, fasciation, leaf-roll, soil sickness, *Heterodera radicola*, stripe disease (*Bacillus Lathyri*), *Cladosporium fulvum*, *Phytophthora infestans*, sunburn, mosaic, curl, hollow stem, *Aleurodes vaporariorum*, *Tetranychus*, aphids, blossom end-rot (*Phytobacter Lycopersicum*), uneven ripening, fruit splitting, hollow fruit. General measures for avoiding tomato diseases are discussed and 2 keys are given for the determination of the above named diseases.—D. Atanasoff.

711. STRANG, R. B. Diseases of the swede crop in Cumberland and Westmorland in 1921. Jour. Ministry Agric. Great Britain 28: 1093-1096. 1922.—Damage to swedes from 4 diseases, powdery mildew, club root, dry rot due to *Phoma napobrassicae*, and bacterial rot due to *Bacillus carotovorus*—is mentioned.—M. B. McKay.

712. TURNER, W. F. Spray schedule for Georgia peach season 1922. Georgia State Bd. Entomol. Circ. 36. 4 p. 1922.—Time of application and mixture for both dust and liquid sprays are detailed.—T. H. McHatton.

713. WESTERDIJK, JOHANNA. Passports for plants. Gard. Chron. 71: 224, 246. 1922.—An address at the International Professional Horticultural Conference at the Hague, Apr. 21, 1922, considers present knowledge of fungous and bacterial plant diseases and the danger of their spreading to countries not yet infected. Numerous examples from past experience are given.—*P. L. Ricker.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 3, 95, 99, 136, 144, 276, 279, 335, 348, 407, 454, 460, 473, 534, 591, 594, 706, 901, 923)

714. ABE, K., and I. SAITO. Active principle of Korean ginseng. Japan Med. World 2: 166. 1922.—The authors found that the substance in ginseng which has inhibitory action on blood sugar is not extracted by petroleum ether or ether, but by pure alcohol. This active principle of ginseng is said to be a glucosid.—[*Through Jour. Amer. Med. Assoc.*]

715. AMBERGER, KARL. Nachweis fremder Stärke im Getreidemehl. [Identification of foreign starches in cereal flours.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 181-182. 1922.—Starches are divided into 2 groups according as they are stable to, or dissolved by, diastase at a given temperature (58-59°C., never over 60°C.). Impure preparations of diastase have caused difficulty. Starches of wheat, rye, barley, and oats are destroyed, while those of corn (*Zea mays*), potatoes, beans, and rice are not. The latter may thus be concentrated for microscopic determination when present in small quantities.—*E. E. Stanford.*

716. BAUMANN, K., und J. KUHLMANN. Ermittlung des Zucker- und Fettzusatzes in Hefebackwaren. [Determination of the addition of sugars and fats in bakery products containing yeast.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 225-232. 1921.

717. BOSMAN, LOUIS PIERRE. Castelin, a new glucoside from *Castela Nicholsoni*. Jour. Chem. Soc. [London] 121: 969-972. 1922.—A glucoside, to which the name castelin was assigned, was prepared from the herb *Castela Nicholsoni*, a member of the *Simarubaceae*. On acid hydrolysis of castelin, crystalline castelagenin was obtained. A bitter principle is also reported to have been found in the bark of *Simaruba amara*.—*F. E. Denny.*

718. BOYER, G. Sur quelques empoisonnements par les champignons. [Mushroom poisoning.] Bull. Trimest. Soc. Mycol. France 37: 134-138. 1921.—Seven cases of mushroom poisoning are reported.—*D. S. Welch.*

719. FEDELI, CARLE. Ricerche sperimentali sull'azione del polline sul cuore degli animali. [Experimental work on the action of pollen on the hearts of animals.] Atti R. Accad. Lincei Roma Rend. Cl. Sci. Fis. Mat. e Nat. 31: 390-391. 1922.

720. GARCIA, F., and R. GUEVARA. Pharmacodynamics of *Datura alba*. Philippine Jour. Sci. 20: 599-609. Pl. 1. 1922.—The alkaloidal content of the seed is 0.5 per cent.—*E. D. Merrill.*

721. GHOSE, MANMATHA N. Further notes on the effect of certain climatic conditions on the cyanogenesis of jowar (*Andropogon sorghum*). Agric. Jour. India 16: 381-387. 1921.—At Sabour, in Bihar and Orissa, temperature and humidity have a great effect on the production and on the rate of disappearance of the cyanogenetic glucoside in this important Indian fodder crop. Even when growth has been retarded by unfavorable climatic conditions, the disappearance of the cyanide has been rapid under high temperatures. Under

low temperatures, the poison persisted for a long time and did not disappear by the addition of excessive moisture to the soil. Appreciable differences in the amount of hydrocyanic acid in plants collected early in the morning and late in the afternoon were also observed.—*A. Howard.*

722. GRIEBEL, C. Die Zellelemente des Maniokmehles. [Cell elements of tapioca flour.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 43: 169-171. Fig. 1. 1922.—A process is devised for use when the characteristic tapioca (*Manihot utilissima* or *M. palmata*) starch is unrecognizably swollen. Starch is removed by chloral hydrate, weak acid, or alkali. Groups of reticulate tracheids surrounded by porous thin-walled cells, and colorless, dotted stone-cells—usually thick-walled and often accompanied by crystal cells—are described and figured as characteristic. Other cell elements are briefly described and figured, as is also the cross-section of the manioc root.—*E. E. Stanford.*

723. GRIEBEL, C. Krystallinische Kalkabscheidungen in pflanzlichen Objekten durch Einwirkung alkalischer Reagenzien. [Crystalline precipitations of calcium salts in plant tissues by means of alkaline reagents.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 172-173. Fig. 1-2. 1922.—Sphaero-crystals of calcium carbonate form in cherry (*Cerasus vulgaris*) leaves and some other leaves when these are treated with Javelle's solution. Calcium carbonate also separates in crystalline form from flours when treated with alkali.—*E. E. Stanford.*

724. J[ATUL], P. A. Iš Musū Botanikos Dr. J. B-s. [From our botanist Dr. J. B.] Želmenija 1: 47-48. 1921; 2: 63-64, 79-80. 1922.—Brief notes are given from the Apszvieta by Jonas Basanavičius.—*C. W. Dodge.*

725. PENFOLD, ARTHUR RAMON. A critical examination of the aromatic aldehydes occurring in certain Eucalyptus oils. Jour. Chem. Soc. [London] 121: 266-269. 1922.—Aromatic aldehydes were separated in pure condition from essential oils obtained from the leaves and terminal branchlets of *Eucalyptus hemiphloia* and *E. salubris*.—*F. E. Denny.*

726. SIMONSEN, JOHN LIONEL, and MADYAR GOPAL RAU. The essential oil from *Blumea Malcomii*. Jour. Chem. Soc. [London] 121: 876-883. 1922.—*Blumea Malcomii*, a small woolly-stemmed herb growing in the western part of the Deccan plateau, yielded on distillation an essential oil resembling caraway-seed oil in odor. The young plants gave the highest yield, about 0.25 per cent of the fresh green tissue. The chemical constituents of the oil were isolated and identified.—*F. E. Denny.*

727. SPEGAZZINI, CARLOS. Plantas venenosos para los ganados. [Plants poisonous to stock.] Rev. Soc. Rural Cordoba [Argentina] 21: 5766-5774. 1921.—The author has found that many popular opinions concerning poisonous plants are wrong. He divides Argentine plants into 3 groups with respect to their poisonous properties. The 1st includes those always poisonous, either entirely or in certain organs, including *Nerium* and *Datura* sp.; the 2nd, those that are occasionally poisonous under certain conditions, such as *Sorghum*, *Zea mays*, and *Solanum tuberosum*. The 3rd group includes those found to be always innocuous.—*John A. Stevenson.*

728. VOGT, E. Nachweis und Bestimmung von Streckmitteln in Mehl und Brot. [Demonstration and estimation of adulteration in flour and bread.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 145-173. 1921.—The author discusses microscopic and chemical studies of the following adulterations: barley-meal, corn-meal, prepared oatmeal, and various potato products. Microscopic work was based on the form and size of starch grains, altered by the baking process, and on the occurrence of natural impurities of the various substances. The diagnosis was aided by differential staining with a weak solution of Congo red in India ink. Diagnosis of potato materials is hindered by extensive alterations of cell-contents. Micro-

scopic quantitative determinations are impracticable. Chemical diagnosis depends upon the "characteristic alkalinity" of the ash. By combined microscopic and chemical means approximately quantitative results may be obtained in some cases.—*E. E. Stanford.*

729. WILCZEK, E. *Note sur les impuretés du cacao.* [Remarks upon the impurities of cacao.] *Schweiz. Apoth. Zeitg.* 59: 120-126. 1921.—This article deals with the impurities (foreign fruits and seed) found in cacao at the time of sorting. Accidental admixture during the drying process and in the great marts of the producing countries is largely blamed. A list is given of the various impurities identified together with the geographical distribution of the mother plant and the source of the cacaos. The impurities are classified by the author as either "caracteristiques," indicating the origin of the cacao, or as "ubiquites," in which it is difficult to form any opinion of origin. Among the former are mentioned *Elaeis guineensis*, *Cocos nucifera*, *Cola vera*, etc., for the Kamerun, and *Cocos* sp., *Euterpe oleracea*, *Phytelphas macrocarpa*, *Bertholletia excelsa*, etc., for tropical America. There is much work to be done on the "ubiquites" group.—*H. W. Youngken.*

730. WOHACK, FRANZ. *Mikroanalytische Verfahren in der Nahrungsmitteluntersuchung.* [Microanalytical methods in food investigations.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 42: 290-299. 1921.—Determinations of vanillin and formic acid are chiefly concerned. Apparatus and methods are described and figured.—*E. E. Stanford.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 32, 33, 91, 94, 95, 119, 188, 191, 193, 195, 203, 208, 210, 215, 220, 226, 228, 285, 405, 410, 440, 443, 452, 460, 533, 537, 540, 673, 687, 691, 692, 698, 717, 721, 725, 726, 848, 849, 851, 852, 853, 856, 857, 863, 868, 873, 879)

GENERAL

731. BANCROFT, WILDER D. *Applied colloid chemistry.* 345 p. McGraw-Hill Book Co.: New York, 1921.—This treatment of the physical chemistry of colloids is intended as an introduction to proposed volumes on the specialized branches of the subject. It is, therefore, very general in its scope. Defining colloids as "any phase which is sufficiently finely divided," it draws material from a wide variety of sources, ranging from war gases and mining processes to eye-color; almost none, however, from biology. This material is treated deductively; a very extensive bibliography is given.—*Mildred L. Johnson.*

732. BERNARD, NOEL. *Principes de biologie végétale.* [Principles of plant biology.] 212 p., 18 fig. Felix Alcon: Paris, 1921.—This forms what is in effect the 2nd volume of a course in botany as presented by the author. The subject matter for the 1st volume of the course appeared in 1918 under the title *L'Evolution des Plantes*. The present volume is divided into 2 parts and is a brief treatise on general plant physiology. In the 1st part there are considered the physiology of the cell, physics of nutrition, metabolism, carbon assimilation, nitrogen nutrition, and external factors. The 2nd part deals with the morphology and physiology of the algae, fungi, and lichens. The concluding chapter is on plant immunity.—*H. C. Young.*

733. MAQUENNE, L. *Précis de physiologie végétale.* [Synopsis of plant physiology.] 172 p. Payot & Co.: Paris, 1922.—This is a brief presentation of physiological principles without illustrations or experiments. In Chapter I are considered such general topics as the composition of the air, the solubility of gases, diffusion, osmosis, colloids, and enzymes. A chapter is devoted to each of the following: germination, growth and carbon

assimilation, nitrogen assimilation, the assimilation of mineral materials, respiration, water movements, migration of foods, and formation of the principal immediate products of nutrition.—*Grace E. Howard.*

734. PETTIBONE, C. J. V. *Physiological chemistry.* 328 p., *Illus.* C. V. Mosby Co.: St. Louis, Missouri. 1922.—This is a general text, including experiments for laboratory work. It is intended primarily for student use, but also for reference by physicians.—*B. M. Duggar.*

PROTOPLASM, MOTILITY

735. BOLTE, ELIZABETH. Über die Wirkung von Licht und Kohlensäure auf die Beweglichkeit grüner und farbloser Schwärmzellen. [On the effect of light and carbon dioxide on the motility of green and colorless swarmspores.] Diss. Leipzig. 37 p. 1920.

736. GRAY, J. The mechanism of ciliary movement. *Proc. Cambridge Phil. Soc.* 20: 352-359. 1921.—This is an experimental study to determine the physiology of the ciliary apparatus—the gills of *Mytilus edulis* (the edible clam) being employed in this instance.—*Michael Levine.*

DIFFUSION, PHYSICO-CHEMICAL PHENOMENA, PERMEABILITY

737. BARRAT, J. O. W. Die Struktur der Gele. [The structure of gels.] *Kolloid Zeitschr.* 28: 217-218. 1921.

738. BERGELL, PETER. Osmotische Extraktionsverfahren in der Landwirtschaft, besonders für Lupinenentbitterung. [The uses of osmotic extraction in agriculture, especially for removing the bitterness from lupines.] *Illustr. Landw. Zeitg.* 42: 108. 1922.—The author suggests briefly how the principle may be applied.—*John W. Roberts.*

739. BOGUE, ROBERT HERMAN. The sol-gel equilibrium in protein systems. *Jour. Amer. Chem. Soc.* 44: 1313-1323. 1922.

740. BOGUE, ROBERT HERMAN. The structure of elastic gels. *Jour. Amer. Chem. Soc.* 44: 1343-1356. 1922.

741. BORESCH, K. Über den Eintritt und die emulgierende Wirkung verschiedener Stoffe in Blattzellen von *Fontinalis antipyretica*. [The penetration and emulsifying action of different compounds in the leaf cells of *Fontinalis antipyretica*.] *Biochem. Zeitschr.* 101: 110-158. 1919.—The author has studied the nature of filiform nodules in the leaf cell of the plant in question and determined their fatty nature by microchemical means. The emulsifying action on these bodies of 4 chemical groups—alcohols, phenols, alkaloids and alkaloidal salts, and ammonia and its derivatives—is considered at length. It was found for alcohols that emulsification was effected by propyl and the higher alcohols but not by those lower in the series. Emulsification is here regarded as related to affinity for the fatty constituents of the nodule rather than to surface tension properties. The phenols were more or less comparable to the alcohols in action, their effectiveness as emulsifiers forming a descending series: thymol, α -naphthol, *o*-cresol, *m*-cresol, phenol, pyrocatechin, resorcin, hydrochinon, pyrogallol, and phloroglucin.—Emulsification by different alkaloids and their salts varied widely, depending in part, apparently, upon permeability. Emulsification was effected in descending order by quinine, cocaine, brucine, strychnine, and codeine. Morphine was entirely ineffective, the cells being practically impermeable thereto. Emulsification by these compounds is attributed to saponification of the fatty substance of the nodule.—In contrast with the results obtained in precipitation of tannin in cell sap by alkaloidal bases and salts, it was found that the threshold concentrations of emulsifying solutions of the free base and salt of an alkaloid were closely approximate. This is accounted for on the ground of permeability of the leaf cell to the alkaloid cation. OH ions intensified emulsification by alkaloids, as did their salts

and free bases, while H ions reduced such action without reducing toxicity, indicated by death of the leaves. The action of ammonia on the nodule is regarded as similar to that of alkaloids. Only those ammonia salts emulsified, the aqueous solutions of which were alkaline. —W. W. Bonns.

742. BRADFORD, S. C. Die reversible Sol-Gel-Transformation. [The reversible sol-gel transformation.] *Kolloid Zeitschr.* 28: 214-217. 1921.

743. FREUNDLICH, H. Ueber den Potentialsprung, der bei der Elektroosmose und verwandten Erscheinungen wirksam ist. [The potential difference, which is effective in electro-osmose and related phenomena.] *Kolloid Zeitschr.* 28: 240-242. 1921.

744. GIRARD, PIERRE, et W. MESTREZAT. Recherches expérimentales sur la perméabilité sélective des cellules vivantes aux ions. Remarque à propos de l'expérience de Donnan sur le rouge Congo. [Researches on the selective permeability of living cells to ions. Comment on Donnan's experiments with Congo red.] *Compt. Rend. Soc. Biol.* 87: 448. 1922.—The authors point out certain differences between their hypothesis of differential permeability and that of Donnan. According to them, whenever there is a preponderance of either H or OH ions in at least 1 of the mediums separated by a permeable membrane, the latter becomes the seat of polarization which is an electrostatic force, and this results in an unequal diffusion of ions which can freely pass through the membrane. In Donnan's experiments with Congo red this is not the case, since the anion of this salt is colloidal and cannot go through the membrane.—S. Morgulis.

745. GIRARD, PIERRE, et W. MESTREZAT. Recherches expérimentales sur la perméabilité des cellules aux ions. Schème physico-chimique de la perméabilité sélective. [Experimental researches on the permeability of cells to ions. A physico-chemical scheme of selective permeability.] *Compt. Rend. Soc. Biol.* 87: 356-357. 1921.—The authors studied the passage through animal membranes of the ions of a neutral salt in the presence of an acid with a different anion. From these experiments they suggest an hypothesis to account for the fact that the ions of the salt do not pass in chemically equivalent amounts. This they ascribe to a polarization of the membrane as a result of which an electrical equilibrium is established on both sides of the membrane with the anions and cations of the salt unevenly distributed. [See also following entry.]—S. Morgulis.

746. GIRARD, PIERRE, W. MESTREZAT, et LI-SHOU-HOUA. Recherches expérimentales sur la perméabilité des cellules aux ions. Schème physico-chimique de la perméabilité sélective. [Experimental researches on the permeability of cells to ions. A physico-chemical scheme of selective permeability.] *Compt. Rend. Soc. Biol.* 87: 358-360. 1922.—[See also preceding entry.]

747. HANDOVSKY, H., und A. WEIL. Die Quellung von Kolloid-Gemischen. I. [The swelling of colloid mixtures. I.] *Kolloid Zeitschr.* 27: 306-311. 1920.—Preliminary to the study of the water-holding power of the components of protoplasm the authors have begun the investigation of other colloid mixtures. The addition of charcoal in amounts up to 0.3 gm. per gm. dry gelatin made as a 20 per cent gel exerts no observable effect upon the swelling of the mixture, but more than this amount of carbon diminishes the swelling. Mixtures of gelatin and lipid behaved similarly. The authors consider that there is an adsorption compound formed that varies with each change in the amounts of the components to form a substance often very different in its properties with but a small change in its composition, water being shared by the components of the complex.—H. E. Pulling.

748. HATSCHKE, E. Die Eigenschaften von elastischen Gelen. [The properties of elastic gels.] *Kolloid Zeitschr.* 28: 210-213. 1921.

749. HATSCHKE, EMIL. Diffusion in deformed gels. Sci. Prog. [London] 17: 86-94. 3 fig. 1922.—A study of elastic gels showed that they remain isotropic for diffusion under stress, and the diffusion velocity is the same in the deformed and in the unstressed gel.—J. L. Weimer.

750. KOPACZEWSKI, W. Les colloïdes et la vie. Rev. Sci. Pures et Appl. 33: 358-364. 1922.—This is a general statement of the importance of colloids in every day life, and treats first of their importance in biology. Osmotic pressure is explained as due to the inflation and deflation of the colloids comprising the cell membrane. Form, growth, and movement are regarded as colloidal phenomena. Fecundation of the egg has been proved to be due to the formation of asters and the asters are the result of the coagulation of the colloids of the plasma—the passage of a sol to a gel. The importance of colloids in physiological functions such as nutrition, nerve functioning, and secretion is stressed.—H. W. Anderson.

751. LUERS, H., und M. SCHNEIDER. Zur Messung der Solvation (Quellung) in Kolloïden. [Measurement of the solvation (swelling) of colloids.] Kolloid Zeitschr. 28: 1-4. 1921.—A method is described by which the viscosity of the colloid in powder form in water is determined and this is shown to change parallel to the change in volume of the colloid.—H. E. Pulling.

752. LYON, T. L., and J. K. WILSON. Liberation of organic matter by roots of growing plants. Cornell Univ. Agric. Exp. Sta. Mem. 40. 7-43. 1921.—The plants were grown under sterile conditions in full nutrient solutions. The containers were flasks of 8 or 12 l. capacity. In experiments with maize, oats, pea, and vetch it was found that the nutrient solution used for each of these plants contained at the conclusion of the experiment an appreciable amount of organic nitrogen, exclusive of the amount present in the residual plant cells found in the precipitate of the solution. Maize was grown for a period of 53 days. In 4 cultures the dry weights of the individual plants varied from approximately 17 to 24 gm. The amounts of organic matter excreted from the roots varied from 353 to 466 mgm. The maximum ratio of organic matter excreted to the dry weight of the plant was 1:37. Some evidence is presented to show that peroxidase is liberated into the nutrient solution.—L. Knudson.

753. MESTREZAT, W., PIERRE GIRARD, et V. MORAX. Recherches expérimentales sur la perméabilité cellulaire. Perméabilité de la cornée de l'oeil vivant. [Experimental researches on cellular permeability. Permeability of the cornea of the living eye.] Compt. Rend. Soc. Biol. 87: 144-147. 1922.—The cornea is a double cellular membrane and lends itself for the experimental study of permeability *in vivo*. This was done by enclosing the eye of a rabbit (previously treated with novocaine) in a special glass bulb well fitted into the orbit and filling the bulb with the test solutions. After exposure for 30 minutes, the eye was carefully washed and the contents of the anterior chamber removed with a fine needle for analysis. The other eye served as the control. $\text{Ca}(\text{NO}_3)_2$ and MgSO_4 were used. The anions and cations of these salts do not penetrate through the cornea in equivalent amounts. Thus, 2 ions of (NO_3) go with 0.03-0.54 ions of (Ca) ; 1 ion of (SO_4) for every 0.38-0.65 ions of (Mg) . The acidity of the medium may increase the permeability, but it does not change the proportion of the ions.—S. Morgulis.

754. MÖLLER, H. P. Rhythmische Fällungserscheinungen in pflanzlichen Zellmembranen. [Rhythmical precipitation in plant cell walls.] Kolloidchem. Beih. 14: 97-146. 1921.—This is an experimental and theoretical study of zone formation with silver nitrate in the walls of cells from seed of wheat (several unnamed varieties), barley, oats, rye, *Brachypodium pinnatum*, from leaves of *Sedum maximum*, *Griselinia macrophylla*, and several unnamed plants. The bands in different tissues were of different degrees of distinctness and of different widths. The mechanism of formation of these bands is believed to be identical with that forming Liesegang's rings in gelatin and this conclusion is supported by: the form and structure of the bands, and the influence of outer conditions (validity of Fick's diffusion

law, influence of water content of the walls, concentration of silver nitrate employed, influence of precipitating salts in the wall, and the diffusion rate of silver nitrate). The results give further evidence of the colloidal nature of cell walls in plants. The corky integument and not the cellulose membrane is selectively permeable in the cereal grains. Photomicrographs illustrate the paper.—*H. E. Pulling.*

755. PIETRKOWSKI, G. Die Wirkung des Strophanthins auf Kolloide. [The effect of strophanthin on colloids.] *Biochem. Zeitschr.* 98: 92-104. *Fig. 1-6.* 1919.—By virtue of its high surface tension, strophanthin effects a precipitation of colloidal solutions. In the presence of hydrophilous colloids, such as gelatin, it reduced the swelling capacity of the latter.—*W. W. Bonns.*

756. PUTTER, ERICH. Untersuchungen über die kapilläre Steigvermögen der Bakterien in Filtrierpapier. [Capillary rise of bacteria in filter paper.] *Diss. Greifswald.* 34 p. 1919.

757. SVEDBERG, TH. Ein kurzer Ueberblick über die Physik und Chemie der Kolloide. [A brief review of the physics and chemistry of colloids.] *Kolloid Zeitschr.* 28: 193-201. 1921.—This is an address.—*H. E. Pulling.*

WATER RELATIONS

758. MASON, F. A. Revival of sporophores of *Schizophyllum commune*. *Nature* 109: 272-273. 2 *fig.* 1922.—Hairs forming the covering of the pileus show remarkable avidity for water. The rate of absorption is much greater than that of ink by blotting paper. This property probably enables the fungus in xerophytic exposures to take full advantage of small amounts of water.—*O. A. Stevens.*

759. MONTFORT, C. Tatsachen und Probleme der Moorökologie. [Facts and problems relating to the ecology of bogs.] *Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens* 1919: A14-A20. 1920.—The paper here reported was read at a meeting of the Natural History Society of Westphalia and the Prussian Rhine in June, 1919, and is largely devoted to a consideration of Schimper's theory of physiological dryness in bogs. The author first describes a series of guttation experiments, carried on with seedlings of Indian corn placed in solutions of various kinds. Poisonous and strongly osmotic solutions stopped the guttation completely, and reasons are given to show that this means an inhibition of water-absorption as well. Bog water, however, had little or no effect on the guttation, and the conclusion is therefore reached that physiological dryness of the environment is not the cause of the xerophytic features of bog plants.—*A. W. Evans*

760. PERALTA, FERNANDO DE. The control of soil moisture by means of auto-irrigators. *Philippine Agric.* 10: 467-477. 3 *fig.* 1922.—Lettuce (*Lactuca sativa*) was grown in pots watered by means of Livingston porous-cup auto-irrigators. The soil moisture content was kept nearly constant. A noteworthy gain in leaf area and dry weight was secured by using auto-irrigation, as compared with periodic watering.—*Sam F. Trelease.*

761. TRELEASE, SAM F. Incipient drying and wilting as indicated by movements of coconut pinnae. *Amer. Jour. Bot.* 9: 253-265. 1 *fig.* 1922.—Running ventrally along each side of the midrib of the pinna of the coconut leaf is a narrow strip of tissue, the "hinge," through the action of which the 2 wings of the pinna may take various positions. When the leaf is well supplied with water they are in approximately the same plane, but when there is a deficiency of water the 2 wings revolve downward, their lower faces approaching each other. In excised samples the angular divergence of the wings was measured and was found to be closely correlated with the water content of the leaf. In leaves attached to the plant the size of this angle may therefore be used as a measure of the water content of the leaf. Using this method, the greatest incipient drying was found to occur in the coconut between 1 and 3 p.m. Individual differences were observed between different plants as to the period of greatest drooping of the wings. The importance of such methods in providing a basis for proper cultivation is emphasized.—*E. W. Sinnott.*

MINERAL NUTRIENTS

762. EHRENBERG, PAUL. *Das Kalk-Kali-Gesetz.* [The calcium-potassium law.] *Landw. Jahrb.* 54: 1-159. 1919.—If a plant poorly supplied with potassium is supplied liberally with calcium, there results a decreased absorption of potassium which may have detrimental effects upon the plant. These effects may be overcome by increasing the potassium content of the fertilizer. Results of numerous experiments are reported in support of this law. Buckwheat and summer wheat were used and the dry weight, potassium, nitrogen, and phosphoric acid content of the plants were determined. A large supply of calcium was found to be responsible for a reduction in the absorption of potassium and also for the reduction in dry weight of the plants. If, however, sufficient potassium was added in time, the injury was wholly averted and the yield somewhat increased. A rather complete digest of the literature bearing on the calcium-potassium law is given.—A. R. C. Haas.

763. ESPINO, RAFAEL B. *Mineral requirement of rice.* *Philippine Agric.* 10: 313-319. 1922.—A review is presented of the literature on the mineral nutrient requirements of rice.—Sam F. Trelease.

764. GERICKE, W. F. *On the physiological balance in nutrient solutions for plant cultures.* *Amer. Jour. Bot.* 9: 180-182. 1922.—Instead of using a single complete nutrient solution for growing wheat seedlings, the author used 3, each one containing (in addition to iron) 2 of the essential elements. The plants were placed in each of these in succession for a day, and this rotation continued for 4 weeks. Six different combinations of these single-salt solutions were used in which the various elements were paired in different ways, and marked differences in the growth of the seedlings were noted between these combinations. Where KNO_3 , MgHPO_4 , and CaSO_4 were the 3 salts used, growth was almost as great as in a complete nutrient solution. Where KH_2PO_4 , CaSO_4 , and $\text{Mg}(\text{NO}_3)_2$ were used, growth was less than half as great. The author believes that the availability and utilization of essential elements by wheat seedlings are affected by the way in which these elements, presumably as ions, are paired. The utilization of nitrates, for example, seems to depend upon the supply of available potassium. Other cation-anion relations are also evident.—E. W. Sinnott.

765. JUNG, JOSEF. *Über den Nachweis und die Verbreitung des Chlors im Pflanzenreiche.* [The detection and the distribution of chlorine in plants.] *Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) Abt. I.* 129: 297-340. 1 pl. 1920 [1922].—The most successful reagents for the detection of chlorine are: (a) thallium acetate 0.5 gm., glycerine 2 gm., distilled water 7.5 gm.; (b) silver nitrate 0.05 gm., 10 per cent ammonia 9.95 gm. The former gives very characteristic crystals but is not delicate enough for small traces of chlorides; silver nitrate is extraordinarily sensitive, and the crystals formed show a delicate and characteristic response to light.—A series of plants from bacteria and myxomycetes to spermatophytes, embracing 137 families and 604 species, were examined for chlorine content. Various ecological groups of seed plants were similarly tested. Such subdivisions as Equisetaceae, Cannabaceae, Amentiferae, Cruciferae, Euphorbiaceae, Umbelliferae, Compositae, Liliaceae, and Iridaceae are particularly rich in chlorine content, while other groups, such as the fresh water Cyanophyceae and Chlorophyceae, lichens, bryophytes, ferns, club mosses, conifers, Betulaceae, Salicaceae, Rosaceae, Ericaceae, and Orchidaceae contain very small quantities,—in fact, few plants were found which contained no demonstrable amounts.—Chlorine occurs as chlorides dissolved in the cell sap. There is a progressive increase in chloride content from the root upward; the largest quantities are found in the apical portion of the stem, the bast parenchyma, and the petiole and veins of the leaf; the leaf mesophyll, the epidermis, the flower parts, guard cells, and woody tissues contain mere traces of, or are free from, chlorides.—Plants characteristic of moist soils, rich in minerals, have the highest chloride content, those of moorlands and sandy soils generally lack it. The absence of chlorides among mosses, ferns, woody plants, epiphytes, and saprophytes is noteworthy.—F. Weiss.

766. MERKENSCHLAGER, FRITZ. *Die Chlorose der Lupine auf Kalkböden.* [The chlorosis of lupine on soils rich in lime.] *Fühling's Landw. Zeitg.* 70: 19-24. 1921.

767. MITSCHERLICH, A. *Vegetationsversuche mit physiologischen Reaktionen.* [Experiments with the physiological reactions of plants.] *Landw. Jahrb.* 54: 477-492. *Pl.* 5-6. 1919. —The author discusses the results of applying various amounts of fertilizer salts to sand cultures in which annual plants were grown. The increase in yield accompanying an increase in fertilizer salts follows, to a certain point, a logarithmic curve. Comparisons are given showing the effect of acid or of alkaline conditions on the yields produced by sodium nitrate, ammonium sulphate, urea, and urea nitrate.—*H. S. Reed.*

768. SKINNER, J. J., and F. R. REID. *Nutrient requirements of clover and wheat in solution cultures.* *Soil Sci.* 12: 287-300. *Pl.* 1, 3 fig. 1921.—Culture solutions with a concentration of 80 parts per million of P_2O_5 , NH_3 , and K_2O were used. Sixty-six solutions in all were employed, some containing each of the salts singly, combinations of 2, and combinations of 3, the ratio of the constituents varying in 10 per cent differences using the familiar triangular plan. Their results seem to verify the common belief that clover is a heavy potash-feeding plant and in general indicate that clover requires a higher proportion of K than of N or P, inasmuch as K was shown to be absorbed in larger proportion than P or N. In the case of wheat, better growth occurred with all 3 of the nutrient elements present, the best growth being in mixtures containing between 10 and 30 per cent PO_4 , 30 and 60 per cent NO_3 , and 30 and 60 per cent K. Greatest absorption occurred in the cultures with greatest growth.—*I. T. Scott.*

769. STUTZER, A. *Düngung mit Kohlensäure.* [Fertilizing with carbon dioxide.] *Illustr.* *Landw. Zeitg.* 42: 107-108. 1922.—Experiments are cited to show the greatly increased yield of tomatoes due to increased supply of carbon dioxide. The author advocates the handling of manure so as to favor optimum aerobic conditions for the bacteria and thus secure maximum supply of carbon dioxide.—*John W. Roberts.*

770. TOTTINGHAM, W. E., and E. J. RANKIN. *Nutrient solutions for wheat.* *Amer. Jour. Bot.* 9: 270-276. 1922.—The optimal nutrient conditions for wheat, as regards reaction, appear to differ as between the germination phase and the later growth of the plant. Hydrogen-ion concentrations which are endured by the plant in intermittently renewed solutions become unendurable when the solution is continuously renewed. Certain pH values which restrict the elongation of stem and root appear to favor the production of dry matter in these organs.—*E. W. Sinnott.*

771. ZIEGENSPECK, H. *Lassen sich Beziehungen zwischen dem Gehalte an Basen in der Asche und dem Stickstoffgehalte der Pflanzen aufstellen, die einen Rückschluss auf die Ernährungsart und die Excretion gestatten?* [Is it possible to establish relationships between the content of bases in the ash and the nitrogen content of the plant which permit a conclusion as to the plant's mode of nutrition and excretion?] *Ber. Deutsch. Bot. Ges.* 40: 78-85. 1922.—The author was prompted to this investigation by Stahl's observation that mycotrophic plants are characterized by a very small ash content. The starting point was the consideration that independent plants secure almost all their nitrogen in the form of salts of nitric acid. Therefore, if the nitrogen content of the plant were reduced to the base equivalent, an indicator would be secured of the manner in which nitrogen is absorbed or of the degree of salt excretion. The base equivalent was calculated as potassium, the ash being evaporated with hydrofluoric and sulphuric acids, and its weight multiplied by K_2/K_2SO_4 . This was then compared with the nitrogen equivalent for nitrates. In the case of mycotrophic plants (except where the presence of considerable iron interfered with the calculations) the nitrogen equivalent overbalanced the base equivalent. In the case of some only slightly mycotrophic plants the base equivalent was slightly in excess of the nitrogen equivalent. In many autotrophic plants a large base excess was found. In most of these cases there was no guttation. Where the nitrogen equivalent in autotrophic plants exceeded the base equivalent the author attributes this to the effect of guttation. In the case of mycotrophic, parasitic, and ammonia plants he attributes it to nitrogen taken in as nitrate. In the case of

autotrophic plants, especially orchids with which the author especially concerned himself, there was an increasing nitrogen equivalent excess with increase in mycotrophy. Analyses of acid soils upon which mycotrophic plants were growing showed practically no nitrogen as nitrate, but considerable as ammonia, or in other forms.—*Anna Sommer.*

PHOTOSYNTHESIS

772. BÜRGI, E., und C. F. VON TRACZEWSKI. Ueber die biologischen und pharmakologischen Eigenschaften des Chlorophylls. [The biological and pharmacological properties of chlorophyll.] *Biochem. Zeitschr.* 98: 256-283. 1919.—Experiments are reported with chlorophyll and with phaeophytin preparations on canaries previously rendered anaemic, to determine the effect of these substances on blood formation. The results indicate that both are effective in rebuilding blood corpuscles under the conditions noted.—*W. W. Bonns.*

773. GRIGORIEW, R. Ueber die blutbildenden Eigenschaften des Chlorophylls. [The blood building properties of chlorophyll.] *Biochem. Zeitschr.* 98: 284-293. 1919.—A confirmation and extension of the work of Bürgi and von Traczewski [see preceding entry] is afforded.—*W. W. Bonns.*

774. JACOBY, M. Über den Formaldehyd als Übergangsstufe zwischen der eigentlichen Assimilation und der Kohlenhydratbildung in der Pflanze. [Formaldehyde as the intermediate between true assimilation and carbohydrate formation in the plant.] *Biochem. Zeitschr.* 101: 1-6. 1919.—Starting with Willstätter's hypothesis of formaldehyde as the end product of the specific assimilation process preceding carbohydrate formation, the author attempts to demonstrate the direct utilization of the aldehyde by green leaves in darkness. Material studied was the abscised leaf of *Tropaeolum majus*, the petioles being immersed in water through cork stoppers which were rendered water tight with paraffin. Before being used in the experiment the leaves were kept in darkness for 48 hours. Apparatus is described by means of which the leaves were surrounded by an atmosphere of CO₂-free air and formaldehyde vapor, provision also being made for a sufficient degree of humidity in the experimental chamber.—One brief table is presented as representative of the kind of data secured. This shows that leaves subjected to formaldehyde from 24½ to 32 hours increased in dry weight from 12 to 15 per cent, as compared with an increase of 1.7 to 5.4 per cent in the controls. The author concludes that the aldehyde is "fixed" by the plant, but ventures no further opinion as to its subsequent conversion.—*W. W. Bonns.*

775. SIEBERT, ALFRED. Ergrünungsfähigkeit von Wurzeln. [Greening capacity of roots.] Dissertation. 37 p. Kiel, 1920.

776. WARBURG, O. Ueber die Geschwindigkeit der photochemischen Kohlensäure-zersetzung in lebenden Zellen. [The rate of CO₂ decomposition in living cells.] *Biochem. Zeitschr.* 100: 231-270. Fig. 1-11. 1919.—An extended study is made of factors affecting the rate of CO₂ decomposition, using the green alga, *Chlorella*. Cultural methods (nutrient solutions) and algal characteristics are described. Experimental methods, apparatus, and principles and formulae involved in the calculation of the data are given in detail. The factors affecting CO₂ decomposition and the results obtained may be summarized as follows: (1) CO₂ concentration. Using amounts of gas varying from $\frac{1}{20}$ to 10 times that of the mean atmospheric concentration, the assimilation rate in constant light intensity was proportional to the CO₂ concentration for the lower values; for the higher values (2×10^{-6} mols. per l. and upwards) assimilation still increased, but at a lower ratio. (2) Light intensity. At low intensities the assimilation rate was approximately proportional to illumination intensity. This fact together with that enunciated in (1) establish the inference that assimilation is proportional to the concentration of a "photo-chemical primary product" and the concentration of a secondary product with which the former reacts. (3) Temperature. Making corrections for concentration changes due to temperature differences, the temperature coefficient varied markedly with temperature and light intensity—at low intensity and moderate

temperatures (15–32°C.) the coefficient was unity. (4) Intermittent illumination. CO_2 decomposition was greater with intermittent light of high intensity than with continuous exposure of the same. With low intensity, no difference between continuous and intermittent exposure was observable. These results are discussed in relation to the work of Brown and Escombe. (5) Substances affecting permeability. Phenylurethan and cyanic acid showed in general similar results, dilute solutions effecting marked assimilatory inhibition, while respiration, in the case of the lower of such concentrations, was stimulated.—*W. W. Bonns.*

METABOLISM (GENERAL)

777. BIEDERMANN, W. *Der Lipidgehalt des Plasmas bei Monotropa hypopitys und Orobanche (speciosa).* [The lipid content of the protoplasm of *Monotropa hypopitys* and *Orobanche (speciosa).*] *Flora* 113: 133–154. *Pl.* 4–5. 1919.—Because of the close association between chlorophyll and lipid substances in the chloroplasts of living leaves and because some experiments seemed to indicate that chloroplasts contain a greater proportion of lipid than the surrounding protoplasm, the author investigated the lipid content of the plants named in the title. These are parasitic, chlorophyll-free plants. Previous work on seed did not permit him to conclude that lipids were contained in the protoplasm. The protoplasm is rich in lipids, however, (about 5 per cent of the dry weight of *Monotropa* was a lecithin-like substance) and this appears to be distributed in 2 distinctly different ways: as crumbly masses evenly throughout the cell and as small drops or compact bodies that have a definite place in the cell, which leads the author to believe that “a lipid must be pre-existent, at least as an ‘Anlage.’” Drawings of the lipid bodies and detailed descriptions of the tissues and chemical methods are given.—*H. E. Pulling.*

778. CURREY, GEOFFREY SAUNDERS. *The colouring matter of the scarlet Pelargonium.* *Jour. Chem. Soc. [London]* 121: 319–323. 1922.—“The anthocyan pigment contained in the petals of the scarlet pelargonium, James Kelway, is, therefore, the diglucoside pelargonin (pelargonidin [1 mol.] + dextrose [2 mol.]).” It was found to occur as an oxonium salt to the extent of about 6 per cent of the dry weight of the petals. Pure crystals of the anthocyanin chloride and anthocyanidin chloride were prepared by methods described in detail.—*F. E. Denny.*

779. EICHELBERGER, MARIETTA. *The carbohydrate content of navy beans.* *Jour. Amer. Chem. Soc.* 44: 1407–1408. 1922.

780. FORSTER, MARTIN ONSLOW, and WILLIAM BRISTOW SAVILLE. *Constitution of picro-rocellin, a diketopiperazine derivative from Roccella fuciformis.* *Jour. Chem. Soc. [London]* 121: 816–827. 1922.—Evidence regarding the constitution of picrorocellin, a colorless, crystalline, bitter substance, was obtained from *Roccella fuciformis*, a lichen, “probably coming from the west coast of Africa.” It was found to be a nitrogenous compound $\text{C}_{26}\text{H}_{22}\text{O}_4\text{N}_2$, and on this account was regarded as of especial interest because of the lack of reports, heretofore, describing nitrogenous substances isolated from lichens.—*F. E. Denny.*

781. KLEIN, GUSTAV. *Studien über das Anthochlor.* [Studies of anthochlor (anthoxanthin).] *Sitzungsber. K. Akad. Wiss. Wien [Math.-Nat. Kl.] Abt. I.* 129: 341–395. 1 *pl.* 1920 [1922].—Anthochlor is the name given by Prantl to a yellow color substance dissolved in the cell sap of yellow flowers and fruits. It is to be distinguished from anthocyanin by its color, from carotin and xanthophyll which are contained in plastids, and from flavones and xanthenes which occur as crystals. A survey of plants with yellow flowers was made to determine the occurrence and distribution within the plant of anthochlor. The presence of anthochlor was determined by microscopic examination and by water extraction. A chemical study was made of its properties, which showed anthochlor to be related to anthocyanin in constitution, properties, and distribution. In some respects, such as resistance to concentrated alkalies and the formation of crystalline acid-addition products with sulphuric acid, anthochlor resembles flavones. The existence of 3 types of anthochlor differing in their

reactions with acids and alkalies, and characteristic of different plants is indicated.—The shade or intensity of the yellow color of flowers bears no relation to the presence of anthochlor or colored plastids; sometimes the color may be due exclusively to one or the other in very closely related species, or plastids and dissolved coloring matter may occur together, the colored cell sap then occupying the outer border of the cell, or the tips of papilliform cells, while the plastids or crystals lie near the inner border.—*F. Weiss.*

782. MAIGE, A. *Influence de la concentration des solutions organiques sur la formation de l'amidon dans les cellules végétales.* [Influence of the concentration of organic solutions on the formation of starch in plant cells.] *Compt. Rend. Soc. Biol.* 86: 856-857. 1922.—Experimenting with beans, the author found that starch begins to appear in plants grown in a 0.2 per cent solution of sucrose (the cotyledons were cut away) and increases in amount with the increasing concentration of the sugar up to 10-15 per cent. With solutions of still greater concentration of the sucrose the starch content of the plant cells rapidly diminishes.—*S. Morgulis.*

783. MÜLLER, FRITZ. *Ueber eine Verbesserung der biologischen Bewertung pflanzlicher Gerbstoffe.* [An improvement of the biological determination of plant tannin.] Dissertation. 37 p. Carl Henstorffs: Rostock, 1919.—The author reviews the various quantitative methods for the determination of tannin and especially the red corpuscle method of Kobert. On the basis of a large number of experiments he suggests the addition of acid to the corpuscle solution as an improvement over the old procedure.—*A. F. Camp.*

784. NIERENSTEIN, MAXIMILIAN. *Catechutannins. Part I. Paullinia tannin.* *Jour. Chem. Soc. [London]* 121: 23-28. 1922.—Paullinia tannin was prepared in crystalline condition from the seed of *Paullinia cupana*. "It is soluble in alcohol, ethyl acetate, or acetic acid, but not in any other organic solvent." It gave color tests of the catechutannins and was precipitated by gelatin and alkaloids. The sodium and potassium salts, and the methylo-derivative of the tannin were formed. When a solution of the tannin was treated with emulsin from bitter almonds, dextrose and optically inactive β -gambier-catechin carboxylic acid were obtained.—*F. E. Denny.*

785. NIERENSTEIN, MAXIMILIAN. *The constitution of catechin. Part IV.* *Jour. Chem. Soc. [London]* 121: 604-613. 1922.—Two different specimens of *Acacia catechu* extract were used for the preparation of a catechin in crystalline condition. Details of methods used in preparing derivatives are given, and proofs offered regarding their molecular arrangement.—*F. E. Denny.*

786. NOACK, KURT. *Der Betriebstoffwechsel der thermophilen Pilze.* [Basal metabolism of the thermophilic fungi.] *Jahrb. Wiss. Bot.* 59: 413-466. 1920.—A study of growth and respiration in a synthetic medium and in hay decoction was made on *Thermoascus aurantius*, *Anixia spadicea*, and *Mucor pusillus*. The data are presented under 5 divisions: basal metabolism at the optimum temperature, the influence of temperature on respiratory activity, the effect of the media on respiration, the influence of zinc sulphate on the respiratory activity at different temperatures, and respiration at reduced oxygen pressures. The respiratory quotient, $\frac{\text{CO}_2}{\text{O}_2}$ for the thermophilic fungi was normal for glucose, 1-1.09. The temperature quotient was low, i.e., the respiratory activity at the higher temperatures did not increase with the increase in temperature according to Van't Hoff's law. The economy coefficient was of the same order as that of the non-thermophilic fungi. The respiratory quotient was unchanged by reduction of temperature. *Thermoascus* reacted very quickly to changes in the composition of the media. Reduction in the O_2 pressure caused no change in the respiratory quotient but there was a marked increase during anaerobiosis.—*W. H. Chambers.*

787. PERKIN, ARTHUR GEORGE, and YOSHISUKE UYEDA. *Occurrence of a crystalline tannin in the leaves of Acer ginnala.* *Jour. Chem. Soc. [London]* 121: 66-76. 1922.—From

the leaves for *Acer ginnala* (Korean maple tree) an extract containing about 30 per cent tannin is used in Japan and China for cotton and silk black-dyeing. The chemical nature of the yellow coloring and tannin matters in the leaves was investigated. A crystalline tannin (termed acertannin), an amorphous tannin, ellagic acid, quercitin, and a "small amount of a phlobo-(catechol) tannin" were found. Acertannin gave deep blue and black colors on cotton, and was regarded favorably as a black dye for silk. The yellow coloring matter was crystallized out and found to be quercitin. The khaki color produced on wool by the leaf extract was attributed to the ellagic acid and quercitin rather than to the tannin itself.—*F. E. Denny.*

788. PFANNENSTIEL, W. Vergleichende Untersuchungen über die Extrahierbarkeit verschiedener säurefester Bakterien mit Äther-Acetongemischen. [Extraction of acid-fast bacteria with ether-acetone.] Zeitschr. Hygiene u. Infektionskr. 95: 87-99. 1922.—Differences in amount of lipoids extracted from the acid-fast bacteria are related to differences in staining properties and pathogenicity. An extensive bibliography is appended.—*W. H. Chambers.*

789. SIEKE, FRITZ. Phenolbildung durch Bakterien. [Phenol formation by bacteria.] Zeitschr. Hygiene u. Infektionskr. 94: 214-223. 1921.—By cultivation in a synthetic medium containing tyrosin 2 strains of phenol-forming bacteria, *Bacterium coli phenologenes*, and *B. paracoli phenologenes*, were isolated and studied.—*W. H. Chambers.*

790. VERKADE, P. E. On the action of micro-organisms on organic compounds. II. The solubility of some organic acids in fatty oils. Proc. Roy. Acad. Sci. Amsterdam [translated from Verslag K. Akad. Wetenschappen Amsterdam] 23: 783-789. 1921.—See Bot. Absts. 11, Entry 1345.

791. WEISS, M. Ueber den quantitativen Nachweis des Tyrosins mittels der Millonschen Reaktion. [The quantitative determination of tyrosin by means of the Millon reaction.] Biochem. Zeitschr. 97: 170-175. 1919.

792. WOHLGEMUTH, J. Ueber den vermeinten Abbau der Stärke durch Formaldehyd. Schlusswort an Frl. Woker. [On the supposed cleavage of starch by formaldehyde. Final reply to Miss Woker.] Biochem. Zeitschr. 99: 316-319. 1919.

METABOLISM (NITROGEN RELATIONS)

793. HONCAMP, F. Wie Können billigst eiweissreiche Futtermittel angebaut und hergestellt werden? [How can cheap protein-rich feeds be prepared?] Landw. Jahrb. 57: 107-137. 1922.—This is a general account of principles of variety selection, fertilization, conservation, and improved methods of utilization.—*Selman A. Waksman.*

794. LOEB, JACQUES. Proteins and the theory of colloidal behavior. 292 p., 80 fig. McGraw-Hill Book Co.: New York, 1922.—This book is concerned with the demonstration of the correctness of 2 important laws for proteins and with the explanation of the chemical and physical properties of proteins by the use of the 2 laws. It is first demonstrated that a protein is amphoteric, and when it exists on the acid side of the isoelectric point it reacts with anions according to ordinary stoichiometric laws, and on the alkaline side of the isoelectric point it reacts with cations. Thus in solutions of sodium chloride or hydrochloric acid of a pH of 4.7 or less gelatin exists as gelatin chloride. In solutions of sodium chloride or sodium hydroxide of pH greater than 4.7 it exists as sodium gelatinate. At the isoelectric point, pH 4.7, it can combine with neither cation nor anion. The second fact made use of to explain the action of proteins is Donnan's theory of membrane equilibria, which states that when a membrane separates 2 solutions of electrolytes one of which contains 1 ion which cannot diffuse through the membrane, the result will be an unequal distribution of the diffusible ions on opposite sides of the membrane. If gelatin chloride is placed in a solution of HCl

the relative concentration of free hydrochloric acid inside and outside the gelatin at the time of equilibrium is determined by the equation $x^2 = y(y + z)$, where x is the concentration of the hydrogen and chlorine ions outside, y is the concentration of the hydrogen and chlorine ions of the free HCl inside, and z is the concentration of the chlorine ions in combination with the gelatin. The 2 laws given above are used to replace hypotheses such as those of adsorption, the Hofmeister ion series, and hydration and dispersion hypotheses used to explain the combination of proteins with salts, their viscosity, swelling, osmotic pressure, etc.—*W. J. Robbins.*

METABOLISM (ENZYMES, FERMENTATION)

795. BACHRACH, E., et H. CARDOT. Influence de l'acidité initiale et de la concentration du milieu sur la marche de la fermentation lactique. [Influence of the initial acidity and of the concentration of the medium on lactic acid fermentation.] *Compt. Rend. Soc. Biol.* 86: 1127-1129. 1922.—With $\frac{1}{2}$ -2 per cent lactose the optimum initial acidity of the medium does not vary and seems to be proportional to the peptone concentration. Thus, with bouillons containing 10 gm. lactose per l. and 0.62, 0.31, and 0.155 per cent peptone, the optimum initial acidity was found to be 0.084, 0.042, and 0.021 N. Under conditions of optimum acidity, the concentration of lactose being constant, the rate of fermentation increases with the peptone concentration. In media containing 11.5, 6.4, 4.5, 3.1, and 1.4 gm. nitrogen per l. respectively, the lactic acid developed in 24 hours was 1.26, 1.02, 0.92, 0.68, and 0.50 N.—*S. Morgulis.*

796. BOKORNY, T. Beitrag zur Kenntnis der chemischen Natur der Enzyme. [The chemical nature of enzymes.] *Biochem. Zeitschr.* 100: 100-113. Fig. 1. 1919.—The author calls attention to the general similarity in proportions of the constituents of enzymes as shown by previous analyses, and determines the amino nitrogen of 11 enzyme preparations. The method is based on the reaction of alkyl-amino substances with nitrous acid: $RNH_2 + HNO_2 = ROH + H_2O + N_2$. The nitrogen is determined by gas displacement rather than by absorption. The data appear to add little to the generally accepted view of the protein nature of enzymes, under present standards of purity.—*W. W. Bonns.*

797. EULER, H., und O. SVANBERG. Zur Kenntnis der Pektase-Wirkung. [The action of pectase.] *Biochem. Zeitschr.* 100: 271-278. 1919.—The authors review briefly the comparatively scant literature on pectase and give results of studies with expressed juice of *Ribes nigrum*, *R. rubrum*, and *R. grossularia*. Acidity was determined in terms of pH. The results show that these species have a closely related natural acidity, the pH ranging from 2.8 to 2.96. The optimum for enzyme action, determined by addition of acid and alkali, appeared to be pH 4.3. No pectase specificity was evident, the enzyme of one species coagulating about equally effectively the juice of another.—*W. W. Bonns.*

798. FAWCETT, GEO. L. Estudio sobre levaduras productoras de alcohol. [Studies on alcohol-producing yeasts.] *Rev. Indust. Agric. Tucuman* 11: 100-103. 1921.—Experiments were carried out with a number of strains of yeasts obtained from distilleries engaged in making industrial alcohol from waste molasses. Certain of these gave a higher per cent of alcohol, indicating possibilities of selecting improved strains for commercial use.—*John A. Stevenson.*

799. HAEHN, H. Die Melaninbildung im autolysierenden Kartoffelpresssaft. [Melanin formation in the autolysis of potato juice.] *Biochem. Zeitschr.* 100: 114-129. 1919.—The author has studied the formation of melanin formed by tyrosinase action in the expressed juice of a number of potato varieties. The melanin standard is expressed in terms of cc. of 0.002 normal potassium permanganate solution necessary to decolorize 1 cc. of the boiled and filtered juice. Amino nitrogen content was also determined.—Melanin content varied considerably in the varieties tested. The autolytic values of the various extracts were obtained from the differences in melanin content before and after autolysis at a definite temperature. Storage of tubers for 6 months increased amino acid content and decreased tyrosinase action. Juice rendered slightly alkaline gave increased melanin formation.—*W. W. Bonns.*

800. MORDHORST, G. Über die Verbreitung eines Tannin und verwandte Stoffe spaltenden Enzyms im Organismus des Menschen und einiger Tiere. [The distribution of enzymes attacking tannins and related compounds in the body of man and some other animals.] Dissertation. 40 p. Carl Hinstorffs: Rostock, 1919.—The author discusses the chemistry of tannins, methods for detection of tannic and gallic acid, and the location of tannin-splitting enzymes in the animal body. He found tannin-splitting enzymes in the intestinal juices and liver, but not in saliva, gastric juice, blood serum, kidney, or spleen. A similar study was made of etelen, or trigallacetol; a triacetylethyl ester of gallic acid; tannigen, an ester formed from acetic acid and tannin; and tannoform, a condensation product of tannin and formaldehyde.—*H. C. Young.*

801. NEUBERG, C. Die physikalisch-chemische Betrachtung der Gärungsvorgänge. [The physico-chemical view of fermentation processes.] *Biochem. Zeitschr.* 100: 289-303. 1919.—This is a reply to Ostwald's criticisms [see *Bot. Absts.* 12, Entry 804].—*W. W. Bonns.*

802. NEUBERG, C., und J. HIRSCH. Die dritte Vergärungsform des Zuckers. [The third fermentation form of sugar.] *Biochem. Zeitschr.* 100: 304-322. 1919.—As a continuation of sugar fermentation studies in presence of alkaline salts, the authors studied the effect of potassium carbonate, dipotassium phosphate, magnesium oxide, tertiary and secondary sodium phosphate, hydroxides of zinc, aluminium and colloidal iron, and mixtures of primary and secondary sodium phosphates in yeast fermentation of sucrose. All the substances added were without effect on yeast invertase. The reaction in each instance occurred according to the equation: $2C_6H_{12}O_6 + H_2O = CH_3COOH + C_2H_5OH + 2CO_2 + 2C_3H_5O_3$. Acetic acid and glycerin were formed in the ratio of 1:2 mols. Hydroxides of aluminium and colloidal iron had no special effect on fermentation. The results in general support the theory previously advanced concerning sugar fermentation in presence of alkaline salts.—*W. W. Bonns.*

803. NEUBERG, C., und J. HIRSCH. Wirkungsweise der Abfangmethode bei der Acetaldehyd-Glycerin-Spaltung des Zuckers. Die Korrelation von Acetaldehyd und Glycerin innerhalb der gesamten Gärführung, der zeitliche Verlauf dieser Vergärungsform und ihre Beziehung zur gewöhnlichen alkoholischen Gärung. [The mechanism of the "fixation" method in the acetaldehyde-glycerine cleavage of sugar. The correlation of acetaldehyde and glycerine during the entire fermentation, the time factor in this process and its relation to ordinary fermentation.] *Biochem. Zeitschr.* 98: 141-158. *Fig. 1-4.* 1919.—The writers review the work of the senior author and others in which by means of "fixation" by alkaline salts acetaldehyde and glycerine are established as definite stages in the yeast fermentation of sugar. Such fermentations are grouped into: (1) The usual alcoholic fermentation ($C_6H_{12}O_6 = 2C_2H_5OH + 2CO_2$); (2) acetaldehyde-glycerine fermentation ($C_6H_{12}O_6 = CH_3CHO + CO_2 + C_3H_5O_3$); (3) Acetic acid-ethyl alcohol-glycerine fermentation ($2C_6H_{12}O_6 + H_2O = C_2H_5OH + CH_3COOH + 2CO_2 + 2C_3H_5O_3$). The present work seeks to determine the acetaldehyde-glycerine relations during the process, their rate of formation and the relation of this type to the ordinary alcohol- CO_2 fermentation. It was found that at every stage during the fermentation in the presence of sodium sulphite acetaldehyde and glycerine are formed in equimolecular quantities. At the same time, ethyl alcohol and CO_2 are produced independently and in equivalent proportions. The stage of fermentation can thus be determined from the amount of alcohol or aldehyde present.—*W. W. Bonns.*

804. OSTWALD, W. Physikalisch-chemische Bemerkungen zu Neuberg's Gärungstheorie. [A physico-chemical consideration of Neuberg's fermentation theory.] *Biochem. Zeitschr.* 100: 279-288. 1919.—In this critical discussion of the work of Neuberg and others [see *Bot. Absts.* 7, Entries 1344, 1345] the writer, while accepting in general the former's fermentation theory, ventures to differ in the interpretation of some of the intermediate reactions in the process, basing his arguments on physico-chemical grounds.—*W. W. Bonns.*

805. TSCHERIKOWSKI, SALOMO AL. *Beitrag zur Kenntnis der Zellfermente.* [Cell enzymes.] Dissertation. 12 p. Berlin and Leipzig, 1921.—The author repeats the work of Abderhalden on specificity of cell enzymes. Using enzyme extracts from liver, muscle, spleen, and kidneys of rabbits, horses, and calves, and a peptone from each of the same organs he followed the hydrolysis of the peptone optically. He found that the kidney extract hydrolyzed all the peptones prepared, whereas the extracts from liver, muscle, and spleen were specific for the peptones from their respective organs. There was no 'species' specificity demonstrated.—A. F. Camp.

806. WOKER, G. *Zur Theorie der Diastasewirkung.* [The theory of diastase action.] *Biochem. Zeitschr.* 99: 307-315. 1919.—This is a critical discussion and defense of the author's previous work, replying to the criticism of Wohlgemuth [see Bot. Absts. 8, Entry 651].—W. W. Bonns.

METABOLISM (RESPIRATION, AERATION)

807. MORSE, STERNE, and NICHOLAS KOPELOFF. *A simple method for anaerobic cultivation in Petri dishes.* *Amer. Jour. Public Health* 12: 119-121. *Fig. 1-3.* 1922.—Two Petri dish bottoms or covers of the same diameter are used. The culture or medium is poured and allowed to harden. It can then be streaked in the usual way. The paired dishes are then turned over and 5 to 10 gm. dry pyrogallic acid placed in the now lower half. About 30 cc. of a 5 per cent solution of sodium hydroxide is quickly poured over the pyrogallic acid. A strip of adhesive tape is immediately placed around the equator thus uniting the halves. The resulting "capsule" is then incubated and treated with no more respect than an ordinary aerobic plate. In order to maintain the condition of anaerobiosis for a long time it is only necessary to varnish the tape. The authors claim for the method that it is simple, inexpensive, efficient, easy to manipulate, and does not require other than stock apparatus.—C. A. Ludwig.

ORGANISM AS A WHOLE

808. DIXON, GUERNEY. *The transmutation of bacteria.* 179 p. Cambridge University Press: Cambridge, 1919.—Aside from certain cultural experiments the book is essentially a review and discussion, from the standpoint of possible transmutation of species, of the literature dealing with morphological and physiological variations in the species of bacteria. The author concludes that while incapable of proof, the transmutation of allied organisms in the human body is suggested but that supposed instances of transmutation experimentally induced rest on inconclusive evidence. An extensive bibliography is included.—C. C. Epling.

809. EULER, H., and J. LAURIN. *Zur Kenntnis der Hefe Saccharomyces Thermantitonum.* [Concerning the yeast *Saccharomyces Thermantitonum.*] *Biochem. Zeitschr.* 97: 156-169. 1919.—This is a discussion of experiments with the above organism dealing with optimum growth conditions, rate of fermentation, inversion capacity, catalase activity, and the effects of acidity and of antiseptics.—W. W. Bonns.

810. GAMBLE, F. W. *Studies in symbiosis.* [Rev. of: BUCHNER, P. *Tier und Pflanze in intrazellulärer Symbiose.* (Plants and animals in intracellular symbiosis.) xi + 462 p., 2 pl. Gebrüder Borntraeger: Berlin, 1921.] *Nature* 109: 538-539, 570-577. 1922.—The 1st part deals with algal associations in lower animals, the 2nd with symbiosis in insects, and the 3rd with bacteria as related to luminosity.—O. A. Stevens.

811. GREENBAUM, SIGMUND S. *On the biologic properties of pathogenic molds.* *Jour. Infect. Diseases* 31: 26-31. 1922.—The author points out the customary neglect of the biologic properties of the higher fungi in most mycological and bacteriological treatises and outlines. This is a study of several pathogenic forms from the standpoint of proteolytic and amylolytic ferments, their actions on various sugars and litmus, indol production, and the production of toxins. Briefly, it was found that while a proteolytic ferment, varying in solubility with

the organism, is common to all pathogenic molds studied, no amylolytic properties were demonstrable. They neither produce acids nor bases nor ferment saccharose, dextrin, glucose, levulose, maltose, or lactose. Two Tricophytons (*T. acuminatum* and *T. gypseum-asteroides*) as well as *Achorion Schoenleinii* were found to elaborate toxins fatal to guinea pigs.—*R. V. Allison.*

812. JORDAN, E. O., and W. B. SHARP. The serologic relationships between strains of the Pfeiffer bacillus. *Influenza studies X.* Jour. Infect. Diseases 31: 198-208. 1922.—In attempting to establish the essential nature of the various strains of the Pfeiffer bacillus it was found that, as a rule, each strain of the organism possessed a serologic individuality. Likewise, no correlation was found between indol production and agglutinative affinities except in strains isolated from meningitis. The inability to group the strains of this organism serologically is accepted as an argument against the assignment of any of its members to the primary causation of epidemic influenza. It is suggested that perhaps a race of "influenza-meningitis" bacilli is in process of evolution.—*R. V. Allison.*

813. KOSER, STEWART A. Development of Paratyphoidenteriditis group in various food-stuffs. Jour. Infect. Diseases 31: 79-88. 1922.—In the study of several type strains of the paratyphoid-enteriditis group in their ability to develop in miscellaneous food stuffs it was found that strains from the Gaertner group multiplied readily in the juices of many cooked vegetables but were rapidly destroyed in the juices of different fruits as well as in the acid liquor of sauerkraut. There was also observed a marked ability of the organism to spread through food stuffs but only under conditions of optimum temperature. It was also found that the development of the Gaertner group in food stuffs is not usually accompanied by visible alteration or spoilage.—*R. V. Allison.*

814. LAPICQUE, LOUIS, et THÉRÈSE KERGOMARD. Changements dans la réaction de l'eau douce sous l'action des plantes aquatiques. [Changes in the reaction of fresh water under the influence of aquatic plants.] Compt. Rend. Soc. Biol. 87: 512-515. 1922.—Experiments were performed with the following plants: *Spirogyra*, *Potamogeton*, and *Elodea*. One gm. of fresh material was placed in 50-100 gm. water. The pH of the water (either from the Seine or from a spring) was determined colorimetrically at regular intervals. In the dark the alkalinity diminished and sometimes the water became rather acid. In the light the opposite phenomenon occurred, the alkalinity of the water rising from an initial pH value of 7.2-7.6 to 9-10. The mechanism of this change of reaction is obvious: it depends on the antagonism between the respiration of the plant liberating CO₂ and the assimilative processes of chlorophyll.—*S. Morgulis.*

815. MOORE, BARRINGTON. Influence of certain soil factors on the growth of tree seedlings and wheat. Ecology 3: 65-83. 6 fig. 1922.—A series of experiments was made at Mt. Kisco, New York, to learn the effect of soils, especially alkaline soils, on natural vegetation. The soils used were glacial quartz sand, pure humus, and mixtures of the sand and humus. The wilting coefficients of these soils in moisture retention tests were 0.85, 43.5, and 2.4 per cent respectively. In the alkalinity tests the same soils were used with addition of 2, 4, and 6 per cent (by volume) of burnt lime, calcium oxide. Another series of soils with a lower admixture of lime was also used and all the soils were titrated for alkalinity. In seed-flats of these soils, red maple seedlings, and seed of wheat, *Pinus resinosa*, *P. Banksiana*, *P. rigida*, and *Thuja occidentalis* were planted. Seed of *Pinus Strobus* were also planted but did not germinate well enough to give results. Eight tables give the data in concrete form. Considering tops and roots, humus gave better results than sand or mixtures of sand and humus. It is assumed that the results with humus are due to the nitrogen content. Pine species, wheat, and *Thuja* responded favorably to humus in the order named. In the more alkaline soil series all plants died rapidly or eventually except *Thuja* and wheat, the 2 last named growing exceptionally well on the series with less lime. On the whole, it is held that slight alkalinity in the soil is far more toxic to plants than the same degree of acidity.—*H. H. M. Bowman.*

816. PHILIBERT, ANDRE, et GEORGES MATHIEU. **Nouveau procédé de l'analyse qualitative des eaux.** [A new procedure of qualitative examination of waters.] *Compt. Rend. Soc. Biol.* 86: 1004-1006. 1922.—The method depends on the addition of lead subacetate to the medium which contains 6 per cent peptone and 2.4 gm. phenol per l. The tubes with the water under examination are kept for 48 hours at 41°C. (1) The tubes which give the indol reaction contain *B. coli*. (2) Those which are blackened, but do not give the indol test, contain putrefying organisms other than *B. coli* or *B. proteus*, probably *para B.* (3) Those which turn black and give the indol test and turn gelose-lactose-litmus red contain *B. coli*, while (4) those which produce blue cultures contain *B. proteus*.—*S. Morgulis*.

817. RAMSBOTTOM, J. **Orchid mycorrhiza.** *Gard. Chron.* 71: 95-96. 1922.—This consists of brief notes on the symbiotic relation.—*P. L. Ricker*.

818. RAYNER, M. C. **Notes on mycorrhiza plants.** *Gard. Chron.* 71: 102, 152. 1922.—Notes are given on the symbiotic relation between fungous hyphae and beech, heaths, orchids, and various other plants.—*P. L. Ricker*.

819. TANNER, FRED W., and GAIL M. DACK. ***Clostridium botulinum*.** *Jour. Infect. Diseases* 31: 92-100. 1922.—Numerous soils as well as samples of feces and sewage were examined in the study of the distribution of *C. botulinum*. The results support, in general, the conclusions of Meyer and Geiger, who suggest the probability of regional distribution. The different strains of *Clostridium* studied were found to exhibit marked variations in their ability to resist dry heat.—*R. V. Allison*.

820. TORREY, JOHN C., and GEORGE T. BUCKELL. **Cultural methods for the *Gonococcus*.** *Jour. Infect. Diseases* 31: 125-147. 1922.—In the discussion of the media employed, special consideration is given the value of amino acids, moisture, reduced oxygen tension, and growth-stimulating substances. Besides presenting the comparative results of the several media used, suggestions for the primary isolation of the organism as well as the maintenance of the stock strains are included. Criteria for the identification of the *Gonococcus* are outlined and fermentation tests for the differentiation from other similar Gram-negative diplococci are emphasized.—*R. V. Allison*.

821. WRESCHNER, HANS. **Untersuchungen über die biologische Bedeutung der Kapsel beim *Micrococcus tetragenus*.** [The biological significance of the capsule in *Micrococcus tetragenus*.] *Zeitschr. Hygiene u. Infectiouskr.* 93: 74-86. 1921.—Successive agar transplants of *Micrococcus tetragenus* showed a gradual decrease in capsule formation and virulence for white mice. In this way a capsule-free strain was isolated and compared with the capsulated culture. The former gave positive phagocytic and complement-fixing reactions. The analogy is drawn between the specific action of the capsule and that of a dialyzing membrane which protects the cell from the entrance of serum antibodies.—*W. H. Chambers*.

GROWTH, DEVELOPMENT, REPRODUCTION

822. BARTHOLOMEW, E. T. **Acid and water content of lemon fruits at different stages of development.** [Abstract.] *Phytopathology* 12: 107. 1922.

823. BAULE, B. **Prinzipielle Überlegungen zum Wachstumsgesetz der Pflanze.** [Considerations of the law of growth of plants.] *Landw. Jahrb.* 54: 493-506. 4 fig. 1919.—This is a discussion of physiological and mathematical aspects of Mitscherlich's equation for the growth of plants. The amount of growth made at any given time must be an integration of all factors up to that time. The course of the growth is determined by a purely time-function, but its limits are set by the life-duration of the plant. The growth law reflects in the size of the plant many changes in growth conditions during the growth period of the plant. The conditions in the middle of the grand period of growth are especially important. The absorption of nutrients appears to be so modified during the growth period that the effect

is a maximum, or, to state it in another way, the materials used in forming plant substance are the least possible.—*H. S. Reed.*

824. FISCHER, HUGO. Beitrag zur graphischen Auswertung der Wachstumserscheinungen bei Pflanzen. [The graphical determination of growth phenomena in plants.] Zeitschr. Forst- u. Jagdw. 51: 527-534. Fig. 1-5. 1919.—The relation of growth of a rye culm to the factors of atmospheric temperature and soil moisture is plotted. By plotting lengths of the culm as ordinates over the time of each measurement as abscissae a figure S is obtained, which the author is convinced will represent the growth of any single plant or any plant organ. In comparing a temperature curve with the curve of actual growth superimposed on the normal curve, it is found that checked growth coincides with increased temperature, and vice versa. The same result is encountered in the influence of precipitation on growth. In other words, the apparent paradox is due to the fact that the favorable or unfavorable effects of temperature and moisture on plant growth are not immediately felt, but are expressed by the plant during the following period, which varies directly in length with the length of the period during which the favorable or unfavorable condition continued.—*J. Roeser.*

825. KONINGSBERGER, V. J. A method of recording growth under various external influences. Proc. Roy. Acad. Sci. Amsterdam [translated from Verslag K. Akad. Wetenschappen Amsterdam] 23: 783-789. 1921.—The paper describes in detail a sensitive and improved form of auxanometer in which the plant carrying a very weak electric current and a contact makes and breaks the circuit, which by means of a relay controlling a stronger current, operates the recording apparatus. The time required for a definite growth increment is recorded.—*L. Knudson.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

826. ANONYMOUS. Plant sensitiveness. Gard. Chron. 71: 283. 1922.—Comments are made on a recent lecture by Keeble at the Royal Institute, in which the writer mentions many new facts on plant movements that have been discovered since Darwin's work and suggests the need of a new work on this subject brought up-to-date.—*P. L. Ricker.*

827. KONINGSBERGER, V. J. Tropismus und Wachstum. [Tropism and growth.] Recueil Trav. Bot. Neerland. 19: 1-136. 3 pl., 17 fig. 1922.—A new method of automatic registration of growth is described whereby measurement is made (1) in complete darkness and (2) during rotation with the clinostat. The auxanometer is located in the room where the experiments are conducted, whereas registration may be made in an adjacent room. The coleoptils of *Avena* in darkness show their highest range of growth upon having reached a height of between 31 and 37 mm. (average 34 mm.). The first green leaf was light insensitive; even an illumination of 90 M.K. had no influence. When plants were put in darkness after 5 hours of illumination no reaction occurred. Observing various growth curves under the influence of light, it is found that in all cases fluctuations ensue. The behavior of "rapidity of growth" and "susceptibility to light" is not a parallel effect.—*J. C. Th. Uphof.*

828. MEADE, R. M. Positions and movements of cotton leaves. Jour. Heredity 12: 444-448. 2 pl., 1 fig. 1921.—The leaves of *Gossypium hirsutum* move definitely in direct reaction to sunlight, and similar movements have been observed in other species of *Gossypium*. The leaves are heliotropic, the movement being controlled by pulvini situated at the base of the petiole.—*J. H. Kempton.*

GERMINATION, RENEWAL OF ACTIVITY

829. DARLINGTON, H. T. Dr. W. J. Beal's seed-viability experiment. Amer. Jour. Bot. 9: 266-269. 1922.—In 1879 Beal prepared 20 bottles, in each of which he placed 50 seed of each of 23 plants mixed with moist sand. These he buried deeply in the soil. At 5-year intervals a bottle was taken up and its seed tested for germination. The 8th test was made in the spring of 1920. Eight species germinated and the total percentage of germination was at least 8.2 per cent. This was somewhat better than the test of 5 years ago.—*E. W. Sinnott.*

830. KNOWLTON, H. E. **Studies in pollen, with special reference to longevity.** Cornell Univ. Agric. Exp. Sta. Mem. 52. 751-793. 1922.—For the experiments reported, pollen of *Antirrhinum majus* L. and that of *Zea Mays* L. were used. The former is long-lived; the latter short-lived. *Antirrhinum* pollen remained viable and capable of germination for 670 days, but the fertilizing power was retained for only 161 days. Death of *Antirrhinum* pollen is not due to desiccation, exhaustion of food material, or to loss of enzymes. Corn pollen is high in moisture content and the chief carbohydrate is starch. It remains viable for a period only of 1 or 2 days. One cause of death of corn pollen is loss of water, but this is not the only one. Protoplasmic changes must be involved in the death of both kinds of pollen. Many data are reported in the relation between various conditions of storage and viability.—L. Knudson.

TEMPERATURE RELATIONS

831. HARVEY, R. B. **Varietal differences in the resistance of cabbage and lettuce to low temperatures.** Ecology 3: 134-139. 6 fig. 1922.—It is desirable (1) to extend the range of crop plants by finding varieties which can withstand lower temperatures than the species in general and (2) to find varieties which can be hardened to low temperatures. The writer experimented with several varieties of cabbage and lettuce to find which ones might extend northward the range of these vegetables in winter culture. Among the cabbages the red varieties do not freeze so quickly as the green ones when the plants are placed in constant-temperature chambers equipped with refrigeration and electric thermal control apparatus. Many varieties of cabbage, both red and green, can easily withstand low temperatures after the plants have been hardened by exposure to low temperatures for varying periods. In lettuce, likewise, the writer finds that the different commercial varieties tested show great differences in the degrees of hardiness. A high sugar content of the leaves does not render the plants less susceptible to freezing, and hardiness seems to depend rather upon differences in the protein constituents of the cells.—H. H. M. Bowman.

832. MAGNESS, J. R. **Chemical and physiological studies of fruit storage.** Proc. Amer. Soc. Hort. Sci. 18: 169-172. 1921 [1922].—This paper presents a discussion of some of the work under way at the Marble Laboratory, Inc., especially that of the life conditions of the apple in storage.—W. E. Whitehouse.

RADIANT ENERGY RELATIONS

833. HARDER, RICHARD. **Lichtintensität und "chromatische Adaptation" bei den Cyanophyceen.** [Light intensity and "chromatic adaptation" in the Cyanophyceae.] Ber. Deutsch. Bot. Ges. 40: 26-32. 1922.—The author found, among 50 species of Cyanophyceae grown in culture, only 2 which showed clearly a color difference when grown in lights of different colors. His experiments were carried out with but 1 of these (*Phormidium foveolarum*). Boresch's results [Ber. Deutsch. Bot. Ges. 37: 1919] were confirmed. The more intense the colored light to which the cultures were exposed the more quickly the adaptive coloration resulted. In weak monochromatic light no change in coloration took place even though in some cases the illumination was sufficient to permit considerable growth. The author calls attention to the differences in coloration in Cyanophyceae induced by different intensities of white light, and he attributes largely to the intensity factor the various colors often exhibited by a given species growing in different locations out-of-doors or by different parts of a single filament.—Richard Holman.

834. HEILBRONN, A. **Das Wesen der Lichtperzeption höherer Pflanzen.** [The nature of light-perception in the higher plants.] Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens 1919: B15-B18. 1920.—A report is here given of a paper presented at a meeting of the Medical and Natural History Association of Münster, Germany, held in December, 1919. The author discusses the question whether plants perceive the direction of light or differences in light intensity, in connection with their heliotropic movements. Although he reaches no definite conclusion, he inclines to the opinion that the direction of the light is the more important factor in the process.—A. W. Evans.

835. NIENBURG, WILHELM. Die Keimungsrichtung von Fucoseiern und die Theorie der Lichtperzeption. [The direction of germination of *Fucus* eggs and the theory of light perception.] Ber. Deutsch. Bot. Ges. 40: 38-40. Fig. 1. 1922.—Such light as may penetrate the *Fucus* egg is rendered diffuse by the presence of the oil drops and fucosan and chlorophyll grains. Hence the author has used the eggs of *Fucus serratus* in an attempt to show whether light direction or differences in light intensity determine the direction of plant reactions to light. As is well known the rhizoid arising on germination of the egg is formed normally on the unilluminated side. In his experiments illumination was from below in such manner that in many cases $\frac{1}{2}$ of each fertilized egg was in the light, the other in darkness. In such cases the rhizoid always arose from the shaded portion and grew at right angles to the direction of the illumination. Fully illuminated eggs formed rhizoids on the side away from the light, growing parallel to its direction; and eggs entirely in the dark developed rhizoids in all directions. The author interprets these results to indicate that it is not light direction but difference in light intensity that determines the direction of germination in the structures studied.—R. M. Holman.

836. WIESSMANN, H. Einfluss des Lichtes auf Wachstum und Nährstoffaufnahme bei verschiedenen Getreidegattungen. [Influence of light on the growth and absorption of nutrients in various genera of grains.] Landw. Jahrb. 56: 155-168. 1921.—Summer rye, barley, and wheat were grown with the same fertilizers but some in the dim light of a court, others in direct light. Those in the dim light yielded less dry matter than those in strong light. The straw of those grown in dim light contained higher percentages of nitrogen, phosphoric acid, and potash than did those grown in strong light.—A. J. Pieters.

TOXIC AGENTS

837. BOAS, FRIEDRICH. Die Wirkung der Saponinsubstanzen auf die Hefezelle. [The effect of saponin substances upon yeast cells.] Ber. Deutsch. Bot. Ges. 40: 32-38. 1922.—The author has measured the carbon dioxide production of yeast cultures containing in each case, in addition to cane sugar and distilled water, 1 of the following: Quillayasaponin, sapotoxin, saponin (Merck-principally quillayasaponin), smilacin, digitonin and guajaksaponin. Among the cultures containing each saponin substance were those also containing either sodium nitrate, sodium chloride, lithium chloride, or magnesium nitrate. Controls with distilled water, with water and sodium nitrate, and with water and lithium chloride were also included. From the results of these experiments the author concludes that highly active saponin substances and such digitonin and smilacin as reduce fermentation injure the yeast cells by reason of the great change which they induce in the colloidal condition of the lipid; whereas the other saponin substances employed, which cause an increase in fermentation in solutions with little or no salts present, alter the colloidal condition of the lipid to a lesser degree and increase permeability without causing injury to the cell. He believes that his results taken together with those of R. Collander, Hansteen-Cranner, and Kahlos may be considered as establishing the truth of the lipid theory of permeability.—R. M. Holman.

838. COBET, R. Ueber den Einfluss der arsenigen Säure auf wachsende Gewebe. [The effect of arsenious acid on growing tissues.] Biochem. Zeitschr. 98: 294-313. 1919.—Solutions of arsenious acid and of arsenic salts proved toxic at dilutions of 1: 200,000 to roots of garden cress, onions, and peas. No growth stimulus at lower concentrations was established. Frog spawn and tadpoles were more resistant, requiring as a lethal dose concentrations of 1: 40,000.—W. W. Bonns.

839. JONESCO-MIHAESTI, et C. POPESCO. L'influence de la concentration en ions H sur le développement et la production de toxines par le bacille de Shiga. [Influence of H-ion concentration on the development and toxin production of the Shiga bacillus.] Compt. Rend. Soc. Biol. 86: 893-895. 1922.—The range of H-ion concentration within which *B. Shiga* develops is from pH 5.4 to pH 9.1, with the optimum concentration at pH 7.1. The produc-

tion of toxin was studied within a pH range of 7.3–8.5 and the maximum values for 24 hours were obtained at a pH of 7.5. At the end of 18 days the toxicity of all the cultures was the same.—*S. Morgulis*.

840. MÜLLER, A. Ist das unzersetzte Wasserstoffsperoxyd oder der aus ihm abgespaltene Sauerstoff Träger der Desinfektionswirkung? [Is the disinfecting action of hydrogen peroxide due to the whole molecule or to the oxygen split from it?] Zeitschr. Hygiene u. Infektionskr. 93: 348–371. 1921.—The disinfecting power of hydrogen peroxide and of hydrogen peroxide plus catalase was tested on *Bacterium coli* and *B. prodigiosum*. The disinfecting action of the hydrogen peroxide was attributed to the whole molecule, for the addition of catalase was inhibitory. The difference between endocatalase and ectocatalase in protecting the bacteria from hydrogen peroxide was studied. The H-ion concentration affected the reactions essentially according to its influence on the catalase.—*W. H. Chambers*.

841. PANISSET, L., et J. VERGE. Action de l'hyposulfite de soude sur le développement des microbes. [The influence of sodium hyposulphite on the development of microbes.] Compt. Rend. Soc. Biol. 86: 848. 1922.—A 1 per cent solution of sodium hyposulphite added to peptone media has no effect on the growth of various germs. A 2 per cent solution has a slight effect on some organisms, and even a 5 per cent solution leaves some pathogenic organisms unaffected.—*S. Morgulis*.

842. ROSENKRANZ, HEINRICH. Untersuchungen über die praktische Verwertbarkeit der oligodynamischen Wirkung der Kupfersalze auf Bakterien. [Investigations on the practical utilization of the oligodynamic action of copper salts.] Dissertation. 11 p. München, 1920.

843. WILCOX, HARRIET LESLIE. The effect of peptone upon the toxigenic property of *B. diphtheriae* No. 8. Amer. Jour. Public Health 12: 608–614. 1922.—The amount of toxin produced by the diphtheria bacillus is shown to be dependent upon the peptone used for several generations previous to the use of the culture for toxin production.—*C. A. Ludwig*.

PHYSIOLOGY OF DISEASE

844. HOPKINS, E. F. Hydrogen-ion concentration in its relation to wheat scab. Amer. Jour. Bot. 9: 159–179. 18 fig. 1922.—The relation of H-ion concentration to the growth of *Gibberella Saubinetii*, the causal organism of wheat scab, and to the ability of this fungus to produce infection in wheat was studied. The pathogen was grown (a) on liquid media the reaction being adjusted in 1 case by H_2SO_4 and NaOH and in another by phosphate solutions, and (b) on agar, adjusted by lactic acid. In each case, a distinct minimum point in the growth curve occurred at from pH 5.5 to pH 6.0. The fact that various reagents were used shows that this minimum was due to H-ion concentration and not to other molecules or ions. Seedlings were then grown in infected soil, the pH of which was controlled by H_2SO_4 and NaOH, and by HCl and NaOH. The degree of infection was here found to have a definite minimum at about pH 5.5. There is evidence from control series that the soil acidity also affects the rate of seed germination. The practical importance of these relations between acidity and wheat scab is pointed out.—*E. W. Sinnott*.

MISCELLANEOUS

845. ANONYMOUS. Do plants know time? Gard. Chron. 71: 189. 1922.—Comments are made on the article of F. F. Blackman [see Entry 846, this issue].—*P. L. Ricker*.

846. ANONYMOUS. [BLACKMAN, F. F.] Do plants know time? Gard. Chron. 71: 175. 1922.—Editorial comment is made on an article of R. Irwin Lynch [see Entry 847, this issue]. *Dracaena goldiana* has been noted to open its flowers each day at exactly 3:55 p.m. Leaf movements of the runner bean are noted. Remarks are also made on temperature and moisture factors.—*P. L. Ricker*.

847. LYNCH, R. IRWIN. How are plants aware of time? Gard. Chron. 71: 31. 1922.—The statement is made that plants flower at the right time as to calendar rather than at the right season according to physical conditions, and several examples are given. [See also Entry 846, this issue.]-P. L. Ricker.

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 6, 15, 39, 46, 52, 72, 73, 81, 86, 91, 93, 101, 102, 106, 111, 113, 118, 119, 205, 214, 215, 221, 239, 285, 312, 376, 428, 443, 473, 482, 522, 525, 752, 760, 762, 763, 767, 768, 769, 815)

848. ANONYMOUS. A note on soil sterilization for tomatoes. Bur. Bio-Tech. Bull. 5. 134-142. 1922.—The importance of destroying malignant organisms in the soil and leaving the benign ones is discussed. A report of the use of dichlorocresol and cresol mixed with soap, dichlorocresol absorbed in basic slag and *p*-toluene sodium sulpho-chloramide for soil treatment is given. Dichlorocresol seems to stimulate growth.—W. H. Tisdale.

849. BAL, D. V. Studies on the decomposition of some common green-manuring plants at different stages of growth in the black cotton soil of the Central Provinces. Agric. Jour. India 17: 133-151. 1922.—Experiments on the decomposition of sunn-hemp (*Crotalaria juncea*) and dhaincha (*Sesbania aculeata*) at various stages of growth are described.—A. Howard.

850. BECHHOLD, H. Ein Kapillarphänomen. [A capillary phenomenon.] Kolloid Zeitschr. 27: 229-233. 1920.—The great concentration of salts in the upper layers of a porous structure, such as soil, brick, or unglazed porcelain, when the salt solution evaporates at the surface, is briefly discussed. The mechanism is not clear since when crystallization occurs the upper layers will be saturated while those below may contain undetectable amounts of the salt.—H. E. Pulling.

851. BROWN, P. E., and J. H. STALLINGS. Inoculated legumes as nitrogenous fertilizers. Soil Sci. 12: 365-407. 1921.—Clover or alfalfa were grown in both sterilized and unsterilized soil in pots, a part of the pots being inoculated with nitrogen-fixing bacteria. The nitrogen content of the tops and the roots was determined by the Kjeldahl method. From 12 to 25 cgm. of nitrogen was fixed per plant by clover and alfalfa on untreated soils. On the average 27 per cent of the total plant nitrogen was in the roots of clover at maturity under natural soil conditions, while with alfalfa 46 per cent of the total nitrogen was in the roots. With clover and alfalfa all the nitrogen in the tops and some of that in the roots came from the air. When clover and alfalfa are grown and the hay crops removed there may be some gain in the nitrogen in the soil, the amount of increase varying with the legume, soil type, inoculation, and general conditions.—W. J. Robbins.

852. BURGESS, P. S. Studies on a drained marsh soil unproductive for peas. Univ. California Publ. Agric. Sic. 4: 339-396. 21 fig. 1922.—The author reports field trials and pot cultures to ascertain the best treatments for promoting growth of peas, and includes extensive studies on the chemistry of an unproductive soil. An attempt was made to ascertain the rates of formation and the absolute amounts of soluble salts formed in the soil by various treatments. Calcium carbonate added to neutrality greatly increased nitrate production, while soluble phosphorus and potassium compounds, without lime, produced no effect. In the field, where drought conditions existed, the application of 1 ton of acid phosphate per acre produced an increase, while liming to neutrality did not increase the growth of peas over that of the check plots. In greenhouse cultures, applying lime or acid phosphate materially increased the amount of dry matter. A periodic study of the H-ion concentration showed that all of the soils to which neutral salts had been added were slightly but consistently less acid than the checks and that the H-ion concentration was notably lowered by acid phosphate. All the

compounds increased the concentration of the soil solutions under the growing crops in comparison with the untreated checks. Gypsum increased the solubility of potassium and magnesium. Calcium carbonate increased the solubility of all ions except potassium. The production of root nodules was inhibited by the applications of nitrates or of calcium carbonate. The addition of soluble phosphorus increased nodule formation, but potassium sulphate and gypsum were without effect.—*H. S. Reed.*

853. CHRISTENSEN, H. R. *Undersøgelser over Jordens stofomsaettende Evne og disses Betydning for Jordbunsforskningen.* [Investigations of the power of change of soils and its importance for soil science.] Nordisk Jordbrugsforskning 1921: 200-207. 1921.—The quantitative methods of bacteriological analysis indicated by Remy have proved very useful. Modified by the author by adding to the soil extract the active species of bacteria, they have gained importance for chemical soil analysis. A new series of experiments has shown that soils which are basic or close to the neutral point, and which show a considerable buffer action, not only give *Azotobacter* development in inoculated mannite solutions, but also break down mannite much more vigorously than the soils lacking in buffer action, *i.e.*, the soils which require lime. For the soils not needing lime a correlation is shown between phosphate content and mannite decomposition, determined, not by the microflora, but by the chemical composition of the soil. Most important is the content of basic Ca-compounds and of easily soluble phosphates. Comparison with field tests have shown this correlation to be promising for a laboratory investigation of the need of phosphate in soils. Only soils of basic reaction and with a certain buffer action have a considerable content of CO_2 -soluble phosphates.—*Ernst Gram.*

854. EMERSON, PAUL. *The colorimetric determination of soil in a colored water extract.* Soil Sci. 12: 413-417. 1921.—By decolorizing with aluminium hydroxide, nitrates can be determined by the phenoldisulfonic acid method in soil extracts colored by soluble organic matter. The method is rapid and accurate.—*W. J. Robbins.*

855. ERDMAN, L. W. *The effect of gypsum on soil reaction.* Soil Sci. 12: 433-448. 1921.—Pot experiments in which gypsum was added in amounts from 100 to 2000 pounds per acre to an acid soil, neutral soil, and basic soil did not increase or correct the acidity as shown by the Tacke lime-requirement method. At the rate of 100, 200, and 500 pounds per acre it did not affect the pH of the soil; 1000 and 2000 pounds per acre increased the pH 0.21 and 0.28 respectively in an acid soil, 0.14 and 0.27 in a neutral soil, and 0.09 and 0.12 in a basic soil. Gypsum added at the rate of 500 pounds per acre to a neutral soil, made to vary in degrees of acidity by the addition of hydrochloric acid and calcium carbonate, did not affect the pH or lime requirement.—*W. J. Robbins.*

856. GAINNEY, P. L., and H. W. BATCHELOR. *Influence of H-ion on growth of Azotobacter.* Science 56: 49-50. 1922.—The maximum concentration permitting growth was found to be pH 5.9-6.0 for all strains isolated. At pH 6.1-6.4 growth was quite as vigorous as at lower values.—*C. J. Lyon.*

857. GREAVES, J. E. *Influence of salts on bacterial activities of soil.* Bot. Gaz. 73: 161-180. 1922.—In experimenting with the effect of soluble salts applied to soil upon the production of ammonia, nitrates, and soluble and organic phosphorus, it was found that these salts were toxic to bacteria, partly because of osmotic disturbances. That this is not the entire cause, however, was shown by the fact that there is an antagonistic effect of certain salts when applied together. The results therefore indicate that the toxicity of soluble salts toward soil microorganisms is due to an osmotic effect which makes it impossible for the cell to take up its normal nutrients, but permits foreign or unbalanced constituents to enter. The foreign or unbalanced salts interact with the cell proteins, forming foreign proteinates and thus rendering the protoplasm incapable of normal functioning. Many of these salts when applied in small quantities increased bacterial activities.—*I. V. Shunk.*

858. JONES, J. S., and J. C. REEDER. **The use of silica crucibles for the determination of potassium in soils.** *Soil Sci.* 12: 419-432. 3 fig. 1921.—By the use of an electric furnace and silica crucibles potassium can be determined accurately, thus eliminating the use of platinum.—*W. J. Robbins.*

859. KAPPEN. **Bodenazidität und Kalkdüngung.** [Soil acidity and liming.] *Mitteil. Deutsch. Landw. Ges.* 37: 660-663. 1922.—In this address the writer explains the causes of various forms of soil acidity, the relation of soil adsorption to acidity, the formation of injurious aluminum and iron salts, and the effect of physiologically acid fertilizers. The bad effect of soil acidity on the physical structure of the soil is pointed out. As remedies it is advised to abstain from the use of such fertilizers on acid soils and to apply instead lime as carbonate or oxide.—*A. J. Pieters.*

860. KILIBNGER, A. **Wie verhalten sich schwefelsaures Ammoniak und Salpeter im Boden?** [What becomes of sulphate of ammonia and saltpeter in the soil?] *Mitteil. Deutsch. Landw. Ges.* 37: 353-354. 1922.—The author points out that the excess of the sulphate of ammonia is held by the colloids in the upper soil layers while excess of saltpeter is lost.—*A. J. Peters.*

861. KRAUS, W. **Weitere Untersuchungen über das Bechhold'sche Kapillarrphänomen.** [Further investigations of Bechhold's capillary phenomenon.] *Kolloid Zeitschr.* 28: 161-166. 1921.—Bechhold noted [see *Bot. Absts.* 12, Entry 850] some experiments on the accumulation of salt crystals at evaporating surfaces of porous bodies that contained aqueous salt solutions. The author finds: evaporation is necessary for the accumulation; drying occurs as noted by Zsigmondy for the dehydration of silicic acid gel, *i. e.*, it takes place at the surface and not gradually throughout, so the salt accumulates at the surface and there is no gradient of concentration below this layer. If a hydrophilic colloid is added the accumulation takes place only at a higher temperature; decreasing the wetability of the surface decreases the accumulation; in holes in the interior of gypsum the accumulation also occurs; it occurs likewise on filter paper pressed between glass plates with about 1 cm. protruding; also on flat surfaces when the liquid is placed thereon as a drop, but the surface must be wetted by the solution; solutions of high viscosity dry with an equal distribution of the salt, *i. e.*, no accumulation at the surface.—*H. E. Pulling.*

862. LIPMAN, J. G., A. L. PRINCE, and A. W. BLAIR. **The influence of varying amounts of sulfur in the soil, on crop yields, hydrogen-ion concentration, lime requirement, and nitrate formation.** *Soil Sci.* 12: 197-207. 2 fig. 1921.—Inoculated and uninoculated sulphur was applied to plots on which barley and soybeans were being grown at the rates of 200, 500, 1000, 2000, and 4000 pounds per acre. Germination of the barley was fair on all plots, but was markedly depressed in the case of soybeans on plots with 1000 pounds per acre and over. Growth of barley was injured on 1000-pounds plots and over, being nearly all killed by the 4000-pound application. Soybeans showed normal growth with 200 and 500 pounds, but growth was depressed where larger amounts were used. The H-ion concentration did not change throughout the season on the 200- and 500-pound plots, but on the 1000- to 4000-pound plots the H-ion concentration increased after 4-8 weeks. The greatest change was from an initial pH of 5.6 in May to a pH of 3.5 in August on the 4000-pound plot treated with uninoculated sulphur. Applications of 200-500 pounds did not influence the lime requirement, but with heavier applications the lime requirement was decidedly increased. The authors believe that the H-ion concentration may give an approximation of the lime requirement varying with different soils and treatments. The nitrate content appeared to vary considerably showing a fairly close relationship to crop growth, the least amounts being found at the time the crops were matured. The relation between H-ion concentration and nitrate content indicates that nitrification is not generally inhibited by increased acidity of the soil.—*I. T. Scott.*

863. LIPMAN, JACOB G., SELMAN A. WAKSMAN, and JACOB S. JOFFE. **The oxidation of sulfur by soil microorganisms.** *Soil Sci.* 12: 475-489. 1921.—A liquid medium, pH 6.0-6.2

containing mineral salts, including tricalcium phosphate and elemental sulfur, was inoculated with a suspension of a compost in which sulphur oxidation was occurring. The pH of the medium was lowered to 1.2 and the soluble phosphate and sulphate increased. Dextrose interfered with the oxidation of the sulphur. The sulphur-oxidizing bacterium was isolated in pure culture by continual transfer, by dilution, and by using media of high acidity; it could not be grown on solid media. Experiments in liquid media with this bacterium in pure culture showed that there first occurs a rapid increase in acidity accompanied by an accumulation of soluble sulphate. The insoluble phosphate is then made soluble by the sulphuric acid. This change is accompanied by a decrease in soluble sulphate and a stationary phase in the acidity. As soon as all the insoluble phosphate is used up the acidity again increases. In 15 days 93.97 per cent of the insoluble phosphate was dissolved. Using media of different initial pH, best growth was obtained at pH 2.0–2.8. A brief description of the bacterium is given.—*W. J. Robbins.*

864. LYON, T. L., and JAMES A. BIZZELL. **Lysimeter experiments. II. Records for tanks 13 to 16 during the years 1913 to 1917 inclusive.** Cornell Univ. Agric. Exp. Sta. Mem. 41. 47–93. 1921.—The data recorded and discussed were obtained from a study of a Volusia silt loam of Tompkins County, New York, held in concrete lysimeters. (See Cornell Univ. Agric. Exp. Sta. Mem. 12 for a description of these lysimeters.) The soil used is of wide distribution in southern New York and is noted for its need of lime and general lack of fertility. Four lysimeter tanks were utilized, 2 being kept bare continuously while 2 were cropped successively to oats, canada peas, maize, oats, and barley. One bare tank and 1 cropped tank received burned lime at the rate of 3000 pounds per acre at the beginning of the experiment. Manure at the rate of 10 tons an acre was applied to all 4 lysimeters in 1913.—The object of the work was to observe the removal of calcium and certain other constituents from the soil by drainage and cropping. In comparing the bare and cropped tanks, it was found that 82 per cent of the rainfall (average annual precipitation 33 inches) was lost by percolation from the former and only 62 per cent from the latter. The average annual percolation losses in pounds to the acre of nitrogen, calcium, and magnesium from the bare tanks were 52, 356, and 45 pounds respectively. Corresponding data for the cropped lysimeters were 10, 341, and 30. The comparative figures for potash and sulphur from the bare and cropped tanks were of a similar order but much less divergent. Only traces of phosphoric acid appeared in the drainage.—The addition of lime had no effect on the amount of percolation water. Liming seemed to favor nitrification, increasing to a marked degree the nitrogen in the drainage water and in the crops grown. An appreciable percolation increase of calcium was obtained by liming the bare soils. The total amounts of calcium removed from the cropped tanks, limed and unlimed, were identical. The influence of liming upon the magnesium was in the same direction although more total magnesium was removed from the limed and cropped soil than from the unlimed and cropped one. Liming had little effect on the precolation losses of potash, phosphoric acid, and sulphur although such a treatment increased the amounts of these constituents removed by the crops.—*H. O. Buckman.*

865. McCALL, A. G. **The lime requirements of Maryland soils.** Rept. Maryland Agric. Soc. 5: 328–331. 1920 [1921].—A soil testing campaign in Maryland showed that of 1,500 soils 5 per cent showed very strong acidity; 10, strong acidity; 27, medium acidity; 18, slight acidity; 14, very slight acidity, and 26, no acidity. The best form of lime to use is that which supplies the available lime at least cost.—*A. Lee Schrader.*

866. McHARGUE, J. S., and A. M. PETER. **The removal of mineral plant food by natural drainage waters.** Kentucky Agric. Exp. Sta. Res. Bull. 237. 331–362. 1921.—More than 50 samples of water from streams and springs in various parts of Kentucky were analyzed for phosphorus, potassium, nitrate-nitrogen, calcium, magnesium, sulphur, sodium, chlorine, and in a few instances manganese. Drainage water from limestone areas contains the greatest amount of mineral matter and that from sandstone areas the least. The waters from the sandstone areas contain more than twice as much potassium as those from limestone areas while

the amount of phosphorus depends on the amount contained in the soil from which the water flows. A positive correlation between nitrate-nitrogen and soluble phosphorus was found. The total mineral matter in solution in large streams is much less than that contained in small streams flowing from limestone areas. More extensive use of cover crops is advised to conserve much of the mineral nutrients now lost through drainage waters.—*W. D. Valleau.*

867. MATTSON, S. E. Die Beziehungen zwischen Ausflockung, Adsorption und Teilchenladung mit besonderer Berücksichtigung der Hydroxylionen. [The relations between flocculation, adsorption, and the electric charges on particles with special reference to the hydroxyl ions.] *Kolloidchem. Beih.* 14⁹⁻¹²: 227-313. 1922.—Suspensions were made of a fine quartz powder, a plastic clay, and a strongly humus Sphagnum turf and these were treated with hydroxyl-yielding compounds and neutral salts. The hydroxyl ion is extensively adsorbed by soils. Flocculation is not only conditioned by the reduction of the charge on the particles but also by strongly charged particles that have adsorbed a large number of ions. The adsorbed ions act as binding members between particles. Hydroxyl ions are not to be considered as uniquely determining soil structure; those ions that remain in excess in the soil solution are of most importance. The ability of soil to adsorb hydroxyl ions influences the solubility of various compounds and explains the acidity of many soils. Many examples of equilibria involving these principles are worked out and the paper is illustrated with photographs and photomicrographs.—*H. E. Pulling.*

868. MELIN, ELIAS. Ultramikroskopische Mikroben im Waldboden. [Ultramicroscopic organisms in forest soil.] *Ber. Deutsch. Bot. Ges.* 40: 21-25. 1922.—Five hundred gm. of humus from a plantation of *Pinus sylvestris* not far from Berlin was extracted with 750 cc. of distilled water at room temperature for 24 hours. A portion of the extract was concentrated in vacuum to $\frac{1}{3}$ its original volume. Portions of the extract were passed through filters with fine, medium, and coarse pores and then added to culture media containing 10 per cent gelatine, 2 per cent glucose, and a little ammonium citrate or a few drops of bouillon. The filters used were Haën's membrane type. Various bacteria present in the soil passed the coarse filter. The extract passed through the medium filter showed no visible evidence of bacteria or other micro-organisms but caused liquefaction of the gelatine, while the extract passed through the finest filter did not cause liquefaction. The author believes the latter fact to be sufficient evidence that the liquefaction of gelatine by the extract passed through the medium filter was not caused by enzymes present in the soil. The concentrated extracts caused liquefaction much more quickly than those which had not been concentrated.—*R. M. Holman.*

869. MOLTE, O. Jauchekonservierung mit Abfallgips. [Urine conservation with waste gypsum.] *Mitteil. Deutsch. Landw. Ges.* 37: 41-42. 1922.—Experiments made showed that urine treated with gypsum gave no better result than did the untreated.—*A. J. Pieters.*

870. ODÉN, SVEN. Die automatisch registrierende Sedimenttiervorrichtung und ihre Anwendung auf einige kolloidchemische Probleme. [The automatic registering sedimentation apparatus and its use in some problems of colloid chemistry.] *Kolloid Zeitschr.* 26: 100-121. 1920.

871. PARR, S. W., ROBERT STEWART, ET AL. Potash shales of Illinois. *Illinois Agric. Exp. Sta. Bull.* 232. 229-252, fig. 1-6. 1921.—The potash shales of Illinois, their geology, distribution, and occurrence in Union County, and finely ground shale as a source of potassium for soil improvement are discussed in the 3 divisions of this publication. When used with lime on a potash-deficient peat soil, a shale from Union County, containing 5 per cent potash, benefited crops markedly under green house conditions.—*O. H. Sears.*

872. PEARCE, J. N., and L. E. MILLER. Some colloidal properties of Pleistocene clays and their bearing on the chemical theory of the formation of Gumbotil. *Jour. Phys. Chem.* 26: 1-24. 1922.

873. PEROTTI, RENATO. *Per la conoscenza dei rapporti fra microorganismi e pianta verde.* [Concerning our knowledge of the relation between microorganisms and green plants.] *Atti R. Accad. Lincei Roma Rend. Cl. Sci. Fis. Mat. e. Nat.* 30²: 233-237. 1921.—Sterilized decoctions of 3 types of cultivated plants, Cruciferae, Leguminosae, and Graminaceae,—were each inoculated with a suspension of garden soil, and the amounts of ammonification, nitrification, and denitrification determined. The maximum ammonification took place in the decoction of Leguminosae, the least in that of the Graminaceae. Denitrification was slight in all cultures. Nitrification was greatest in the Graminaceae and least in the Leguminosae. After 20 days there was abundant development of Hyphomycetes in the cultures of Leguminosae, only a few in Graminaceae, and almost none in Cruciferae.—*F. M. Blodgett.*

874. POPE, HAROLD B. *Nauru and Ocean Island. Their phosphate deposits and workings.* *Agric. Gaz. New South Wales* 33: 391-402. 3 fig., 2 maps. 1922.—History and descriptions of these deposits are given. The total deposits are estimated to be in excess of 100,000,000 tons of high grade phosphate.—*L. R. Waldron.*

875. PUCHNER, HEINRICH. *Die "Hysteresis" wässeriger Aufschwemmungen humoser Boden.* [The "hysteresis" of aqueous extracts of humus soils.] *Kolloid Zeitschr.* 26: 159-168. 1920.—Extracts made with boiling water from a peat containing lime were turbid and at first gave an acid reaction; later the liquid became clear and was alkaline to litmus. The changes in the extract as its age increases and the differences in the residue left after slow evaporation at different ages are discussed with the aid of photographs and photomicrographs. The slow changes in the extract were due not only to chemical and physical reactions of the materials of the extracts, but low forms of plant life played a part and their growth formations were characteristic.—*H. E. Pulling.*

876. RAMANN, E. *Kalkdüngung und Kalkwirkung im Boden.* [The effect of calcium on soils.] *Illustr. Landw. Zeitg.* 42: 59-60. 1922.—A brief discussion is presented of the effects, chiefly chemical, of calcium carbonate and calcium oxide on soils.—*John W. Roberts.*

877. REED, J. W. *Practical significance of organic carbon-nitrogen in soils.* *Soil Sci.* 12: 491-495. 1921.—An examination of 37 soils failed to show a correlation between soil productivity and the organic carbon-nitrogen ratio.—*W. J. Robbins.*

878. RELWANI, LOKERAN L. *Kalar reclamation as carried out on the Sukkur Farm.* (Alkali soil reclamation in Sind, India.) *Poona Agric. Coll. Mag.* 12: 117-123. 1921.—The reclamation is difficult because of the heavy texture of the soil. Methods employed include (1) irrigation, with drainage ditches on the lower sides of fields; (2) growing suitable alkali-resistant crops, such as sava (*Panicum stagninum*) for 1-2 seasons; (3) scraping off efflorescent salts where accumulations are pronounced; and (4) plowing and planting to bersim (*Trifolium alexandrinum*), which gives a good stand after 1-2 years.—*Robert L. Pendleton.*

879. ROSSI, GIACONIO. *Preliminary note on the microbiology of the soil and the possible existence therein of invisible germs.* *Soil Sci.* 12: 409-412. 1921.—A decanted extract of fresh soil was filtered through an aseptic Chamberland filter into flasks containing sterile culture media. After incubation the culture liquid was tested for products which might be formed by bacterial action. No evidence of indol production or the formation of nitrites was found.—*W. J. Robbins.*

880. RUSSELL, E. J. *Les micro-organismes du sol dans leurs rapports avec la croissance des plantes. Position actuelle du problème.* [The micro-organisms of the soil in their relation to the growth of plants. Present status of the problem.] *Ann. Sci. Agron. Française et Étrangère* 18: 49-67. 1921.—The author reviews the microbiological work with soil organisms at the Rothamsted station, emphasizing Russell and Hutchinson's protozoan theory to account for the beneficial effect of partial sterilization of the soil. Studies are being made on the rate

of decomposition in the soil of phenol, cresol, naphthaline, toluene, benzene, and other aromatic hydrocarbons, and a beginning has been made in the study of the comparative sterilizing efficiency of various agents and their derivatives. Results show that chloromethylene benzene is more efficient than methyl benzene, which in turn is more efficient than benzene, for 1 group of organisms reported.—*A. B. Beaumont.*

881. SHEDD, O. M. A comparison of the calcium content of some virgin and cultivated soils of Kentucky by an improved method for the estimation of this element. *Kentucky Agric. Exp. Sta. Bull.* 236. 303-330. 1921.—Because of the remarkable results obtained from the use of limestone on the soils of Kentucky, the calcium content of virgin and cultivated soils was studied in order to determine the effect of cultivation on this constituent. An improved method of estimating the total and easily-soluble calcium in soils is described. Tables are given showing the total and easily-soluble calcium in virgin and cultivated surface and subsoils of 10 different soil areas of Kentucky. It appears that cultivation has caused a considerable loss of calcium. The best types of soils usually contain the largest amounts of calcium, phosphorus, sulphur, and manganese, and the poorest the lowest. Many soils were found to be so low in calcium that this deficiency requires consideration.—*W. D. Valleau.*

882. SJOLLEMA, B. Verland tusschen grasgroei, grondwaterstand en slootwater. [Relation between grass growth, ground water, and ditch water.] *Cultura* 34: 81-82. 1922.—The writer presumes that when the Zuider Zee has been drained it will have much influence upon the grass production of neighboring meadows and farm lands. In order to study the height of the ground water, it is advisable to place pipes vertically in the soil on the desired localities so that the height of the water may be measured.—*J. C. Th. Uphof.*

883. TAMHANE, V. A. Investigations into the nature of the salt lands of Sind (India). *Bombay Presidency. Dept. Agric. Bull.* 96. 57 p., 4 pl. 1920.—Much of the surface soil on the right bank of the Indus is medium to heavy textured, but often a sandy subsoil greatly facilitates good drainage. The left bank soils are heavier textured, with a variable tight subsoil. Numerous tables give the chemical composition, the percentages of alkali salts, and the mechanical analyses of the samples studied. In order to prevent new areas from being ruined by surface accumulations of alkali salts, economy in the use of irrigation water is urged. To prevent surface evaporation better tillage methods are advised.—*Robert L. Pendleton.*

884. UNGERER, ERNST. Versuche zur Klärung der Bildung von Schichten in Tontrübungen und deren Verwendung in der Bodenanalyse (zur Ermittlung der Teilchengrösse). [Researches to explain the formation of layers in clay suspensions and their application to soil analysis (to determine the size of particles).] *Kolloidchem. Beih.* 14³⁻⁵: 63-96. 1921.—The author reviews the literature dealing with explanations of this phenomenon. In his own experiments he centrifuged suspensions of ultramarine blue and ultramarine red and removed samples from each distinct layer, the particles of which were counted and measured. From these data and the dry weights of unit volumes of the suspensions, the weights of the individual particles were ascertained. The particles in different strata are decidedly different in size and weight. The size of particles was also determined by observations on the time required for settling and by calculation from Stoke's law. The agreement was good. The time of settling was also determined for a fine clay and for emulsions of gum arabic, various oils, and water. The agreement between observed and calculated diameters is good. From the velocity of migration of a layer and Stoke's equation the characteristic size of particles in the groups that correspond to the different strata can be obtained, and this may be used in soil analysis. Size and weight of particles must be considered as determining the strata which differ markedly from each other. Each layer extends to the bottom of the vessel. The temperature should be constant for good formation of strata. Layers form either in the presence or absence of electrolytes unless the electrolyte has marked coagulating power.—*H. E. Pulling.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 19, 238, 267, 323, 351, 438, 500, 516, 553)

GENERAL

885. ANONYMOUS. [Rev. of: MERRILL, E. D. *A bibliographic enumeration of Bornean plants*. Jour. R. Asiatic Soc. Straits Branch, Special number. 687 p. 1921 (see Bot. Absts. 11, Entry 3553).] Jour. Botany 60: 59-60. 1922.

886. ANONYMOUS. *The Index Kewensis*. [Rev. of: PRAIN, D. *Index Kewensis Plantarum Phanerogamarum*. 5th Suppl. 1909-1915 inc. iii + 277 p. Clarendon Press: Oxford. 1921 (see Bot. Absts. 11, Entry 3199).] Nature 109: 472-473. 1922.—Improvements over earlier volumes are noted in citation of date of publication of books and periodicals referred to and in fuller geographical citations.—O. A. Stevens.

887. ANONYMOUS. [Rev. of: WILDEMAN, E. DE. *Contribution a l'étude de la flore du Katangar*. [Contribution to the flora of Katangar.] viii-cxlv + 264 p. D. Reynaert: Bruxelles, 1921.] Nature 109: 548. 1922.

888. CAÑEDO, JENARO. *Flora de Jalisco y Colima*. [Flora of Jalisco and Colima.] Jalisco Rural [Mexico] 4: 545-547, 619-620, 640-641, 681-682, 703-704. 1922.—Brief popular descriptions are given with the Mexican common names of economic plants of Jalisco and Colima.—John A. Stevenson.

889. CHEESEMAN, T. F. *The vascular flora of Macquarie Island*. Australasian Antarctic Expedition 1911-14. Under the leadership of Sir Douglas Mawson. Sci. Rept. Ser. C.—Zool. and Bot. Vol. VII, Part 3. 4 to., 63 p., 1 map. William Applegate Gullick: Sydney. 1919.—The present publication is based primarily on collections made from December 1911 to November 1913 by Harold Hamilton. Thirty-four species of vascular plants, a number somewhat in excess of previous records, are recorded from Macquarie Island. One species of grass, *Triodia macquariensis* Cheesm., is new to science. Of the 34 species recorded 3 are endemic and not known to occur elsewhere. Of the remaining 31 all but 4 are found in the New Zealand subantarctic islands, and practically one-half of these are circumpolar—occurring in Fuegia or the South Georgia to Kerguelen groups of islands. The author concludes that “the present flora of Macquarie Islands, excepting only the three endemic grasses, does not date further back than the close of the last glacial epoch. Since then, in agreement with the other islands of the subantarctic zone, its history has been a history of plant-migration, mainly from the New Zealand outlying islands, but in some cases from the far-distant Kerguelen group.”—J. M. Greenman.

890. GAUMÉ, JACQUES. [Rev. of: FLORA BATAVA. *Afbeelding in beschrijving der nederlandsche gewassen*. 406°-409° aflevering. The Hague, 1921.] Rev. Gén. Bot. 34: 320. 1922.

891. GEE, N. GIST. [Catalogue of plants of Kiangsu province.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 4: 1117-1124. 1919; 5: 207-212, 603-622, 729-748, 800-814, 1147-1165. 1920; 6: 211-229, 318-335, 417-434, 622-637, 720-733. 1921.—The writer has made a large collection of vascular plants in the province of Kiangsu, China. The present paper is a revised English edition of his first published list with the additional equivalent of a Chinese translation of the botanical descriptions and names by CHUNG-SHU CHIEN. A key in Chinese and in English to families of plants collected is appended.—Chunjen C. Chen.

892. HALES, B. J. **Selected western flora. Manitoba, Saskatchewan, Alberta.** *Small 8 vo., 181 p., 89 fig.* The Macmillan Company of Canada, Ltd: Toronto, 1922.—This work concerns ferns, fern-allies, and flowering plants of that part of North America mentioned in the title. It includes representative species of leading genera of the region, but makes no claim to completeness. It is intended primarily to meet the needs of students of high schools and collegiate institutions of the prairie provinces. A brief key to the families is given, but few keys are inserted for the differentiation of species. The specific descriptions are clear and concise.—J. M. Greenman.

893. HU, HSIEN SU. [A herbarium list of plants of Kiangsi and Chekiang.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 6: 1248-1254. 1921.—This list places on record 152 determined plants of the provinces of Kiangsi and Chekiang, China.—Chunjen C. Chen.

894. HU, HSIEN SU. [The botanical names of Kiangsi plants.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 6: 1144-1171, 1232-1247. 1921. [Text in Chinese.]—A list of botanical names for 518 species of vascular plants collected in the province of Kiangsi, China, is presented with the equivalent Chinese names in characters. The localities where the plants were collected are also recorded.—Chunjen C. Chen.

895. JATUL, P. A. **Mažas Botaniškas Žodynėlis. Dalis I. Augmenu Vardai.** [Small botanical dictionary. I. Plant names.] *Želmenija* 2: 50-62, 67-72, 1922.—[See also Bot. Absts. 11, Entry 1049.]

896. SARASIN, FRITZ, und JEAN ROUX. **Nova Caledonia. Forschungen in Neu-Caledonien und auf den Loyalty-Inseln. Botanik.** [New Caledonia. Researches in New Caledonia and on the Loyalty Islands. Botany.] 4 to. Vol. I-L. iii. p. 177-311, pl. 7-8. C. W. Kreidel's Verlag: Berlin and Wiesbaden, 1921.—The present part of this extensive work is edited by HANS SCHINZ and A. GUILLAUMIN. Several specialists have cooperated in the study of different groups of plants. The taxonomic portion of the work consists of an enumeration of plants from the Gonystilaceae to the Compositae inclusive, and a short supplement. A limited bibliography and synonymy, a statement of general distribution, together with the habitat of the plant in New Caledonia or in the Loyalty Islands accompany each species recorded. Detailed descriptions of several species new to science are given, as well as critical notes on previously published species. A chapter entitled Cécidies de la Nouvelle-Calédonie by C. HOUDARD is included; and an extended chapter is added under the caption of Essai de Géographie Botanique de la Nouvelle-Calédonie by A. GUILLAUMIN. The new species and combinations included are: *Grewia crenata* Schinz & Guillaumin (*Mallocoeca crenata* Forster), *Hybanthus ilicifolius* Schinz & Guillaumin (*Ionidium ilicifolium* Vieill.), *Eugenia Sarasinii* Guillaumin, *Xanthostemon sulfureum* Guillaumin, *Rapanea Rouzii* Guillaumin, *Achradotypus Sarasinii* Guillaumin & Dubard, *Solanum camptostylum* Bitter, *S. neo-caledonicum* Bitter & Schlechter, *S. noumeanum* Bitter, *S. Vieillardii* Bitter, *Pseuderanthemum loyaltiense* Guillaumin, *Psychotria pulchrebracteata* Guillaumin, *Ficus mareensis* Warburg, and *Moorea streptophylla* Guillaumin.—J. M. Greenman.

897. SARGENT, C. S. [List of determinations of plants collected in Chekiang.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 7: 269-273. 1922.—The author presents a list of 98 plants, collected in Chekiang province, China.—Chunjen C. Chen.

898. TURRILL, W. B. [Rev. of: VALLENTIN, MRS. E. F. **Illustrations of the flowering plants and ferns of the Falkland Islands.** With descriptions by Mrs. E. M. Cotton. xii + 64 pl. + text + ii. L. Reeve and Co.: London. 1921 (see Bot. Absts. 11, Entry 3201).] *Nature* 109: 370. 1922.

SPERMATOPHYTES

899. ANONYMOUS. [Rev. of: GAMBLE, J. S. **Flora of the Presidency of Madras.** Pt. 4. **Rubiaceae to Ebenaceae.** p. 579-768. Adlard and Son and West Newman: London, 1921 (see Bot. Absts. 10, Entry 1413).] *Nature* 108: 464. 1921.

900. BATTANDIER, J. A. *Labiée ligneuse du Maroc constituant un nouveau type générique.* [Ligneous mint of Morocco constituting a new genus.] Bull. Sta. Recherches Forest. Nord. Afrique 1: 200-201. Pl. 21. 1921.—The type description of a new woody plant of the mint family is given. It is the only species of a new genus, *Pitardia*, and is named specifically *P. nepetoides* Batt.—J. Kittredge, Jr.

901. BLAKE, S. F. *A remarkable new species of Ichthyothere.* Jour. Washington [D. C.] Acad. Sci. 11: 301-303. Fig. 1. 1921.—This genus, which is represented by about a dozen species, all South American, is of economic importance among the natives because the bruised leaves and stems when placed in water tend to stupefy fish, making them easy to capture. All the previously known plants are distinguished by being low herbs or somewhat shrubby plants with compact inflorescence. A new species, collected by F. W. Pennell in Colombia, has loosely racemose-panicked heads and climbing habit. It is described under the name *I. scandens* Blake.—Helen M. Gilkey.

902. BLAKE, S. F. *Key to the genus Diplostephium, with descriptions of new species.* Contrib. U. S. Nation. Herb. 24: 65-86. Pl. 21-28. 1922.—The introduction to this paper contains a history of the chiefly South American genus *Diplostephium* of the family Asteraceae, with a discussion of the characters afforded by the modifications of the style branches in the genus and of their evolutionary significance. It is followed by a description of the genus and a key to the 5 groups and 40 species recognized. An additional doubtful species is also listed. The following new species and new names occur: *Diplostephium adenachaenium*, *D. empetrifolium*, *D. parvifolium* (*D. microphyllum* Wedd., not Nees), *D. pycnophyllum*, *D. macrocephalum*, *D. cicatricosum*, *D. oblanceolatum*, *D. baccharideum*, *D. revolutum*, *D. Weddellii* (*D. sessiliflorum* Wedd., not Spreng.), *D. sejaense* (Kuntze), *D. umbelliferum*, *D. pleistogynum*, *D. costaricense*, *D. obtusum*, *D. bicolor*, *Aplopappus canus* (A. Gray), *Gynoxys foliosa* (Rusby). Eight of the new species described are illustrated by photographs.—S. F. Blake.

903. BLAKE, S. F. *Two new species of Acanthospermum from the Galapagos Islands.* Jour. Washington [D. C.] Acad. Sci. 12: 200-205. Fig. 1. 1922.—*Acanthospermum brachyceratum* and *A. leptolobum* are described, and a key is included for these 2 species, together with *A. lecocarpoides*. These are all the known species belonging to the *Lecocarpopsis* section of the genus, and are all from the Galapagos Archipelago.—Helen M. Gilkey.

904. BUSCALIONI, LUIGI, e GIUSEPPE MUSCATELLO. *Studio monografico sulle specie americane del gen. "Saurauia" Willd.* [Monograph of American species of the genus *Saurauia* Willd. (continued).] Malpighia 29: 231-246. 1922.—Several varieties of *Saurauia leucocarpa* Schlecht. are compared and their affinities discussed.—Edith K. Cash.

905. CANDOLLE, CAS. DE. *Zwei neue Piper aus Neu-Mecklenburg.* [Two new Pipers from New Mecklenburg.] Bot. Jahrb. 57: 354-355. 1922.—This is No. 71 of Series VIII of the Beiträge zur Flora von Papuasien. *Piper Peekelii* and *P. anisopleurum*, both of the Bismark Archipelago, are described as new.—K. M. Wiegand.

906. COWAN, J. M., and A. M. COWAN. *The species of the genus Dipterocarpus found in the Chittagong District.* Indian Forester 48: 68-73. Pl. 5-6. 1922.—The 6 known species of *Dipterocarpus* are described and a key for their identification is given. That more species have not been found is probably due to the size of the trees and the fragmentary specimens which have been secured.—E. N. Munns.

907. DIELS, L. *Die Myrtaceen von Papuasien.* [The Myrtaceae of Papuasiasia.] Bot. Jahrb. 57: 356-426. Fig. 1. 1922.—This is No. 72 of Series VIII of the Beiträge zur Flora von Papuasien. The Myrtaceae of Papuasiasia comprise 20 genera and 160 species. With respect to this family the region may be divided geographically and as to affinities into (a) the primary forest and mountain bush, and (b) the savannahs and secondary bush. The former is further

divided into (1) the coast zone up to 1000 m. altitude, and (2) the upper zone above 1000 m. The Myrtaceae of the coast zone are related to those of Malasia and west and north Australia. In the upper zone there is a strong element related to plants in widely different parts of the world, even South America, suggesting that the mountains of Papuasias possess an important element of the ancient flora of the southern hemisphere. The savannah region shows a distinct relation to drier portions of Australia. The genera included are *Rhodamnia* Jack., *Myrtella* F. v. M., *Xanthomyrtus* Diels, *Psidium* L., *Decaspermum* Forst., *Octamyrtus* Diels, *Jossinia* Comm., *Eugenia* L., *Rhodomyrtus* DC., *Jambosa* DC. (50 species), *Syzygium* Gärtn. (44 species), *Xenodendron* L. & S., *Metrosideros* Banks, *Mearnsia* Merrill, *Xanthostemon* F. v. M., *Tristania* R. Br., *Eucalyptus* L'Her., *Leptospermum* Forst., *Melaleuca* L., and *Baeckea* L. The following new species, varieties, and combinations are proposed: *Rhodamnia Ledermannii*, *R. sepicana*, *R. polyantha*, *R. lamprophylla*, *Xanthomyrtus fasciculata*, *X. Schlechteri*, *X. longicuspis*, *X. longicuspis*, var. *fruticosa*, *X. scolopacina* (*Eugenia scolopacina* Ridley), *X. Pullei*, *X. polyclada*, *X. Klossii* (*Myrtus Klossii* Ridley), *X. arfakensis* (*Myrtus arfakensis* Gibbs), *X. linnaeifolia*, *X. koëbrensis* (*Myrtus koëbrensis* Gibbs), *X. calythrachoides*, *X. prostrata* (*Myrtus prostrata* Gibbs), *X. compacta* (*Myrtus compacta* Ridley), *Decaspermum leptanthelium*, *D. arfakense*, *D. laxiflorum* (*Nelitis laxiflora* Bl.), *D. prunoides*, *D. humifusum*, *D. petraeum*, *D. coriandri* (*Nelitis coriandri* Bl.), *D. rhodoleucum*, *Octamyrtus pleiopetala* (*Eugenia pleiopetala* F. v. Müll.), *O. insignis*, *O. Behrmannii*, *Jossinia Schlechteri*, *Rhodomyrtus novoguineensis*, *Jambosa longipes* Warb. var. *leptopoda*, *J. Bartonii* (*Eugenia Bartonii* Bailey), *J. gonatantha*, *J. papuana* (?*Decaspermum papuanum* Lauterb.), *J. Leonhardi*, *J. keroantha*, *J. platycarpa*, *J. alutacea*, *J. verniciflora*, *J. brevicyma*, *J. riparia*, *J. salicina*, *J. phacelantha*, *J. polyphlebia*, *J. gonioptera*, *J. cladoptera*, *J. combretiflora*, *J. xylopiacea*, *J. tympanantha*, *J. soliflora*, *J. tricolor*, *J. trachyantha*, *J. lagynocalyx*, *J. pycnantha*, *J. pachyantha*, *J. decoriflora*, *Syzygium triphlebium*, *S. orthoneurum*, *S. modestum*, *S. Pullei*, *S. subsimile*, *S. Schumanniana* (*Jambosa Schumanniana* Niedenzu), *S. cruriflorum*, *S. Schlechteri*, ?*S. recurvo-venosum* (?*Jambosa recurvo-venosa* Lauterb.), *S. heloanthum*, *S. dictyoneurum* and var. *oreogonum*, *S. Caroli*, *S. viburnoides* *S. Torricellianum*, *S. rosaceum*, *S. leptophlebium*, *S. platypodum*, *S. leptoneurum*, *S. oxyphyllum* *S. scytophyllum*, *S. tolypanthum*, *S. ganophyllum*, *S. leucoderme*, *S. effusum* (*Eugenia effusa* A. Gray), *S. homichlophilum*, *S. petraeum*, *S. leptanthelium*, *S. taeniatum*, *S. benjaminum*, *S. alatum* (*Aphanomyrtus alata* Lauterb.), *S. lamprophyllum*, *S. gyrostemoneum*, *S. brachyanthelium*, *S. pyrrophloeum*, *S. dolichorhynchum*, *S. Peekelii*, *S. iteophyllum*, *Metrosideros brachyanthera*, *M. iteophylla*, *M. Pullei*, *M. hypargyrea*, *M. aurea* (*Bacchousia aurea* Ridley), *M. Gibbsiae* (*Bacchousia arfakensis* Gibbs), *Mearnsia ramiflora* (*Metrosideros ramiflora* Lauterb.) and var. *humilis*, *Tristania oreophila*, and *Eucalyptus Schlechteri*. The genera *Xanthomyrtus* and *Octamyrtus* are described as new.—K. M. Wiegand.

908. DIELS, L. Beiträge zur Kenntnis der Combretaceen von Papuasien. [Contributions to the knowledge of the Combretaceae of Papuasias.] Bot. Jahrb. 57: 427-430. 1922.—This is No. 73 of Series VIII of the Beiträge zur Flora von Papuasien. Notes are given on the 2 species of *Combretum* L. and the 8 species of *Terminalia* L. known from Papuasias. *Terminalia oreadum*, *T. phaeoneura*, and *T. sepicana* are described as new. *Combretum flavo-virens* Lauterb. is *Pygeum dolichobotrys* Lautb. & Schum., *Terminalia trinervia* Lautb. & Schum. belongs to the Flacourtiaceae and should be called *Bennettia trinervia* (Lautb. & Schum.) Gilg. n. comb.—K. M. Wiegand.

909. DIELS, L. Die aus Papuasien bekannten Theaceen. [The Theaceae known from Papuasias.] Bot. Jahrb. 57: 431-435. 1922.—This is No. 74 of Series VIII of the Beiträge zur Flora von Papuasien. The Theaceae do not form an important part of the flora of Papuasias. Those found are all above 500 m. altitude, mostly between 1000 and 2000 m. Four genera and 8 species are listed. The genera are *Gordonia* Ell., *Ternstroemia* L., *Adinandra* Jack., and *Eurya* Thunb. The following species and varieties are described as new: *Adinandra calosericea*, *Eurya leptantha*, *E. tigang* K. Schum. vars. *meizophylla* and *phyllopoda*, and *E. oxysepala*.—K. M. Wiegand.

910. DIELS, L. *Die Dilleniaceen von Papuasien.* [The Dilleniaceae of Papuasiasia.] Bot. Jahrb. 57: 436-459. 1922.—This is No. 75 of Series VIII of the Beiträge zur Flora von Papuasien. In this paper 3 genera and 56 species are treated. The genera included are *Dillenia* L., *Tetracera* L., and *Saurauia* Willd. (41 species). The following new species, varieties, combinations, and names are proposed: *Dillenia macrophylla* (D. *alata* var. *macrophylla* Lauterb.), *D. calothyrsa*, *D. montana*, *D. Schlechteri*, *D. castaneifolia* Miq. var. *dolichobotrys*, *Tetracera lanuginosa*, *T. floribunda*, *T. pilophylla*, *Saurauia meiantra*, *S. drimytiliflora*, *S. desquamulata*, *S. iboana*, *S. Schumanniana* (S. *rosea* Lauterb., not Jungh.), *S. pilogyne*, *S. submodesta* and var. *procumbens*, *S. holotricha*, *S. Caroli*, *S. xiphophylla*, *S. amplifolia*, *S. echiioides*, *S. stirrolepida*, *S. vagans*, *S. phaeosepala*, *S. rupestris*, *S. buddleifolia*, *S. egregia*, *S. pannosa*, *S. achyrantha*, *S. Naumannii*, *S. oreadam* and var. *humilis*, and *S. Rudolphi*.—K. M. Wiegand.

911. DIELS, L. *Die Dipterocarpaceen von Papuasien.* [The Dipterocarpaceae of Papuasiasia.] Bot. Jahrb. 57: 460-463. 1922.—This is No. 76 of Series VIII of the Beiträge zur Flora von Papuasien. The few species known from this region are found at lower altitudes and are related to those of Celebes and the Philippines. This is probably a young element in the flora. Four genera and 10 species are listed. Of these species *Hopea papuana* is described as new, and 2 other new species are noted but without names. The genera included are *Anisoptera* Korth., *Hopea* Roxb., *Shorea* Roxb., and *Vatica* L.—K. M. Wiegand.

912. DIELS, L. *Die Bignoniaceen von Papuasien.* [The Bignoniaceae of Papuasiasia.] Bot. Jahrb. 57: 496-500. Fig. 1. 1922.—This is No. 78 of Series VIII of the Beiträge zur Flora von Papuasien. With the exception of 2 more widely distributed species the Bignoniaceae of Papuasiasia are endemic. They are found both on the lowlands and highlands. The genera represented are *Tecomnanthe* Baill., *Pandorea* Spach., *Neosepicaea* Diels, and *Dolichandrone* Fenzl. The genus *Neosepicaea* is described as new. The following new species and combinations are proposed: *Tecomnanthe aurantiaca*, *T. montana*, *T. saxosa*, *Pandora stenantha*, ?*P. leptophylla* (*Tecoma leptophylla* Bl.), *Neosepicaea viticoides*.—K. M. Wiegand.

913. ENGLER, A. *Ein neuer Saxifragen-Bastard.* [A new hybrid in Saxifraga.] Bot. Jahrb. 57: Beibl. 127: 63. 1922.—The hybrid described is *Saxifraga cuneifolia* × *rotundifolia*, also named × *S. Mattfeldii* n. sp. It was collected by Mattfeld in Kärnthen near Hermagor.—K. M. Wiegand.

914. ENGLER, A. *Saxifragaceae-Saxifraga (Pars generalis).* Pflanzenreich Heft 69 (IV. 117). p. 1-47, 4 fig. 1919.—The author presents a general introductory part to the monograph of *Saxifraga* in which he gives the most important literature pertaining to the genus, a detailed statement of the morphology, the geographical distribution, and the relationships within the family. In connection with the geographical distribution of the genus 3 great floral kingdoms are designated, namely, (1) Boreales Florenreich, (2) Palaetotropisches Florenreich, and (3) Zentral- und südamerikanisches Florenreich. These floral kingdoms are divided variously into territories, and the territories again into provinces. The species of *Saxifraga* most characteristic of the individual provinces are enumerated.—J. M. Greenman.

915. ENGLER, A., UND E. IRMSCHER. *Saxifragaceae-Saxifraga. II. Sectiones Trachyphyllum, Xanthizoon, Euaizoonia, Kabschia, Porphyryon, Tetrameridium, Diptera Spec.* 234-302 et Additamentum. Pflanzenreich Heft 69 (IV. 117. ii). p. 449-709, 24 fig. 1919.—The present, or 2nd, part of this monograph is concerned with an elaboration of the sections mentioned in the title and includes about 70 species, numerous varieties, forms, and hybrids. Several species, for example, *Saxifraga aspera* L., *S. aizoides* L., *S. bronchialis* L., *S. lingulata* Bell., *S. aizoon* Jacq., *S. porophylla* Bertol., and *S. oppositifolia* L. are designated as polymorphic types. These types, or species, are divided variously into subordinate categories, namely, subspecies, varieties, forms, hybrids, etc., which are described and exemplified by the citation of exsiccata, and their geographical distribution is given in considerable detail. A number of new varieties, combinations, and hybrids are recorded. The supplement contains

many additions and corrections for annotation in the 1st part of the monograph, which was issued in 1916. The new species, described here for the first time, are: *Saxifraga Stolitzkae* Duthie, *S. subsessiliflora* Engl. & Irmsch., *S. kumaunensis* Engl., and *S. quadrifaria* Engl. & Irmsch., all indigenous to the Himalayan region.—J. M. Greenman.

916. HARMS, H. Eine neue Art von *Platymiscium* (Leguminosae) aus Brasilien. [A new species of *Platymiscium* from Brazil.] Bot. Jahrb. 57: Beibl. 127: 64. 1922.—The species described is *Platymiscium Zehntneri*.—K. M. Wiegand.

917. HITCHCOCK, A. S. A perennial species of teosinte. Jour. Washington [D. C.] Acad. Sci. 12: 205–208. 1922.—This first perennial species of teosinte, which was collected by the author in Mexico in 1910, differs from all other known species by the possession of rhizomes, and is described under the name *Euchlaena perennis*.—Helen M. Gilkey.

918. HUTCHINSON, J. *Rhododendron praeteritum* n. sp. Gard. Chron. 71: 149. Fig. 73. 1922.—The plant described was grown at Kew Garden and is related to *R. maculiferum* and *R. oreodoxa* Franch.—P. L. Ricker.

919. KILLIP, E. P. New *Passifloras* from Mexico and Central America. Jour. Washington [D. C.] Acad. Sci. 12: 255–262. 1922.—Eleven new species are described under the following names: *Passiflora apetala*, *P. fruticosa*, *P. Cookii*, *P. costaricensis*, *P. Heydei*, *P. panamensis*, *P. Rovirosae*, *P. talamancensis*, *P. platyloba*, *P. Purpursii*, *P. Williamsii*. The variety known as *P. foetida arida* Mast. & Rose, has been raised to specific rank under the name *P. arida*.—Helen M. Gilkey.

920. KRAUSE, K. Die *Loranthaceen* Papuasiens. [The *Loranthaceae* of Papuaia.] Bot. Jahrb. 57: 464–495. Fig. 1–4. 1922.—This is No. 77 of Series VIII of the Beiträge zur Flora von Papuaia. The previously known species of *Loranthaceae* from this region have been increased from 24 to 57, distributed among 5 genera namely, *Elytranthe* Blume, *Loranthus* L., *Phrygilanthus* Eichl., *Notothixos* Oliv., and *Viscum* L. The majority of species are endemic. Plants of this family inhabit the various altitudinal zones, though certain genera or sections are characteristically lowland or alpine. Certain species are notable because of their creeping or twining habit about the host, a feature found also among certain Indian, Malayan, and American species. The following species and combinations are proposed as new: *Elytranthe macropoda*, *E. Versteegii* (*Loranthus Versteegii* Lauterb.), *E. pallidiflora*, *E. leucantha*, *E. Peekelii*, *E. Schlechteri*, *E. longifolia*, *E. neurophylla*, *E. acutifolia*, *E. Ledermannii*, *E. torulosa*, *E. verrucosa*, *E. spathulifolia*, *E. diversifolia*, *Loranthus kaniensis*, *L. djamuensis*, *L. Schultzei*, *L. basiflorus*, *L. obtusus*, *L. rigidiflorus*, *L. Thespesiae*, *L. tenuisepalus*, *L. Wichmannii*, *L. iboensis*, *L. articulatus*, *L. squarrosus*, *L. verticillifolius*, *L. melastomatifolius*, *L. molliflorus*, *L. spathatus*, *L. curvifolius*, *L. heterochromus*, *Phrygilanthus novo-guineensis*, *Notothixos spicatus*, *N. Schlechteri*, and *N. Ledermannii*.—K. M. Wiegand.

921. LAUTERBACH, C. Die *Lecythidaceen* Papuasiens. [The *Lecythidaceae* of Papuaia.] Bot. Jahrb. 57: 341–353. Fig. 1–4. 1922.—This is No. 70 of Series VIII of the Beiträge zur Flora von Papuaia. Of this family 3 genera and 21 species are found in this region of which 15 species are endemic. Some are showy trees of the coastal forests. *Barringtonia speciosa* L., *B. Schuchardtiana* K. Schum., and *B. Novae-Hiberniae* Laut. produce edible seed. With 2 exceptions the *Lecythidaceae* inhabit the lowlands. Twenty-five per cent of the endemic species are found only on New Pommern and New Mecklenburg. Keys to the genera and species are given. The genera treated are: *Planchonia* Bl., *Careya* Roxb., and *Barringtonia* Forst. The following species are described as new: *Barringtonia papeh* and *B. quadrigibbosa*, Bismark Archipelago; *B. pauciflora*, *B. apiculata*, and *B. sepikensis*, northeastern New Guinea. A new variety, *B. calyptrocalyx* K. Schum. var. *mollis*, is proposed.—K. M. Wiegand.

922. LAUTERBACH, C. Die *Rhamnaceen* Papuasiens. [The *Rhamnaceae* of Papuaia.] Bot. Jahrb. 57: 326–340. Fig. 1–3. 1922.—This is No. 69 of Series VIII of the Beiträge zur

Flora von Papuasien. Eight genera and 13 species are known from this region. Many species are found in the coastal swamps and along the river banks. A large number of lianes occur. The genera included are: *Ventilago* Gaertn., *Smythea* Seem., *Zizyphus* Juss., *Dallachya* F. v. M., *Rhamnus* L., *Colubrina* L. C. Rich., *Alphitonia* Reiss, and *Gouania* Jacq. Keys are given to the genera and species treated, and the following new species are proposed: *Smythea macrophylla*, *Zizyphus papuanus*, *Z. djamuensis*, *Rhamnus nigrescens*, *R. papuanus*, and *R. Schlechteri*, northeast New Guinea; *R. sumbawanus*, Sumbawa. New varieties are: *Gouania microcarpa* DC. vars. *papua*, *novo-hibernica*, *rugulosa*, and *mollis*. A key to the species and varieties of *Gouania* found in the monsoon region is given, and also a discussion of this genus.—K. M. Wiegand.

923. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. VI, Part 2. p. 61-106, pl. 212-215. William Applegate Gullick: Sydney, April, 1922.—This part introduces a chapter on Hybridization in the Genus; it is followed by descriptions and illustrations of the following hybrids: \times *Eucalyptus algeriensis* Trabut, *E. amplifolia* Naudin, \times *E. antipolitensis* Trabut, \times *E. Bourlieri* Trabut, \times *E. Cordieri* Trabut, \times *E. gomphocornuta* Trabut, \times *E. jugalis* Naudin, *E. occidentalis* Endl. var. *oranensis* Trabut n. var., \times *E. pseudo-globulus* (Hort.) Naudin, \times *E. Trabuti* Vilmorin, *E. Stuartiana* \times *globulus* Trabut, and \times *E. insizwaensis* Maiden n. sp. The chapter on Bark which was begun in the previous volume of this work is continued in the present part. *IBID.* Part 3. p. 107-164, pl. 216-219. May, 1922.—This part is concerned primarily with natural hybrids of which the following (except *Blackburniana*) are described and illustrated, as new: \times *Eucalyptus barmedmanensis*, \times *E. tenandrensis*, \times *E. Peacockeana*, \times *E. Stopfordi*, \times *E. Forsythii*, \times *E. auburnensis*, \times *E. yagobiei*, \times *E. Blackburniana*, and *E. studleyensis*. Miscellaneous notes on hybrids are added, and under the caption of Timber a discussion is given of the various *Eucalyptus* woods.—J. M. Greenman.

924. MAIRE, RENÉ. Les *Adenocarpus* de l'Afrique du Nord. [The members of the genus *Adenocarpus* of North Africa.] Bull. Sta. Recherches Forest. Nord Afrique 1: 211-217. Pl. 22-23. 1921.—North Africa is especially rich in *Adenocarpus*, containing 11 of the 18 known species. Of these, 7 are found in Morocco and 4 in Algeria. A list of these 11 species, with the localities of their occurrence, is given. Technical notes are recorded in Latin for a little known species, *A. umbellatus* Coss. & Dur. Two new species are described, *A. Faurei* and *A. Boudyi* Batt. & Maire. A key to the North African species is also included.—J. Kittredge, Jr.

925. MATTFELD, JOH. Beitrag zur Kenntnis der systematischen Gliederung und geographischen Verbreitung der Gattung *Minuartia*. [Contribution to the knowledge of the systematic subdivision and geographical distribution of the genus *Minuartia*.] Bot. Jahrb. 57: Beibl. 127: 13-63. 1922.—The genus as here understood includes *Arenaria*, *Cherleria* L., *Queria* L., *Honckenya* Ehrh., *Rhodalsine* Gay, *Greniera* Gay, *Siebera* Schrad., and *Hymenella* Moc. & Sess. The paper consists of 2 chapters, of which the 1st deals with the relationship of genera in the *Alsinoideae* and the 2nd with the subdivision of the genus into sections and groups, with consideration of their geographical distribution. In the former it is noted that the genera with a 5-carpetted gynoeceum are relatively primitive. The reduction to 4 carpels occurs readily in diverse groups, while the 3-carpetted gynoeceum is more distinct and more fundamental. The author notes Fernald's discussion of the unity of the genus *Arenaria*. The 2nd chapter is subdivided as follows: (1) Limits of the genus. (2) Historical account of the attempts at classification. (3) Account of the essential characteristics: a. germination and cotyledons; b. growth forms and inflorescence of annuals; c. growth forms and inflorescence of perennials; d. anatomy of the stem and the trichomes; e. foliage; f. calyx and sepals; g. corolla; h. androeceum and staminal glands; i. gynoeceum; j. seeds; k. diclinism. (4) Division of the genus into sections and groups. Seventeen sections are proposed and discussed, and a key to these is given. The center of distribution of the genus is Europe with many species in North America, while the genus is almost unrepresented in eastern Asia, Africa, and South America. *Minuartia Engleri* and *M. Wettsteinii*, both of southern Europe, are described as new.—K. M. Wiegand.

926. PAX, F., UND KÄTHE HOFFMANN. *Euphorbiaceae-Acalyphaeae-Plukenetinae. Euphorbiaceae-Acalyphaeae-Epiprininae. Euphorbiaceae-Acalyphaeae-Ricininae.* Pflanzenreich Heft 68 (IV. 147, ix-xi). 184 p., 29 fig. 1919.—This paper concerns 19 genera, of which *Tragia* with 126 species is by far the largest. A few new genera are proposed; certain sections of Müller are raised to generic rank, several new species are described, and new combinations made. These are: *Eleutherostigma* n. gen. with 1 species, *E. Lehmannianum*, from Colombia; *Angostylidium* (*Plukenetia* Sect. *Angostylidium* Müll. Arg.) n. gen., *A. conophorum* (*Plukenetia conophora* Müll. Arg.); *Apodandra* n. gen. from Peru and Bolivia, *A. lorentensis* (*Plukenetia lorentensis* Ule), *A. Buchtienii* (*Plukenetia Buchtienii* Pax); *Pterococcus corniculatus* (*Plukenetia corniculata* Sm.), *P. africanus* (*Plukenetia africana* Sond.), *P. procumbens* (*Plukenetia procumbens* Prain); *Anabaenella* (*Anabaena* Juss., not Rehb.) n. gen., *A. tamnoides* (*A. tamnoides* Juss.), *A. tamnoides* vars. *genuina* and *sinuata* (*Plukenetia sinuata* Ule); *Haematostemon* (*Astrococcus* Sect. *Haematostemon* Müll. Arg.) n. gen., *H. coriaceus* (*Astrococcus coriaceus* Baill.); *Tragia leucandra* (*Leucandra betonicifolia* Klotzsch), *T. fallacina*, *T. caperonioides*, *T. catamarcensis*, *T. Emilii*, *T. volubilis* L. vars. *longifolia* and *pedicellaris* (*T. pedicellaris* Müll. Arg.), *T. amblyodonta* (*T. nepetifolia* var. *amblyodonta* Müll. Arg.), *T. tenella*, *T. aliena*, *T. paraguariensis* and vars. *canescens*, *macrophylla* (*T. uberabana* var. *macrophylla* Chod. & Hass.), *subsessilis* (*T. bahiensis* var. *subsessilis* Chod. & Hass.), *discolor* (*T. uberabana* var. *discolor* Chod. & Hass.), and *glabrescens*, *T. microcarpa*, *T. pseudomelochioides*, *T. adenophila* and vars. *mollis*, *ferruginea*, and *glanduligera*, *T. depauperata*, *T. urens* L. var. *innocua* (*T. innocua* Walt.), *T. Hieronymi*, *T. Karsteniana*, *T. Stolziana*, *T. pungens* (Forsk.) Müll. Arg. vars. *genuiana* Pax & Hoffm. and *cinerea* Pax, *T. Mülleriana* vars. *cordata* and *unicolor* (Müll. Arg.), *T. cannabina* L. f. vars. *hastata* (L.) and *Hildebrandtii* (Müll. Arg.), *T. lasiophylla*, *T. dioica* Sond. vars. *lobata* (Müll. Arg.) and *Schinzi* Pax, *T. lancifolia* Dinter, *T. glabrata* (*T. Meyeriana* var. *glabrata* Müll. Arg.), *T. furialis* Bojer vars. *eufurialis* (*T. furialis* Prain) and *Scheffleri* (*T. Scheffleri* Bak.). *T. Milbraediana*; *Tragiella* n. gen. of African plants, *T. natalensis* (*Tragia natalensis* Sond.), *T. anomala* (*Tragia anomala* Prain), *T. Friesiana* (*Tragia Friesiana* Prain); *Sphaerostylis malaccensis* (*Megistostigma malaccense* Hook. f.), and *Pachystylidium* n. gen. from Java and the Philippines, represented by *P. hirsutum* (*Tragia hirsuta* Blume) vars. *genuina* and *irritans* (*Tragia irritans* Merrill); *Epiprinus malayanus* Griff. vars. *genuinus* and *Balansae*; *Ricinus communis* L. var. *inermis* (*R. inermis* Jacq.).—J. M. Greenman.

927. PAX, F., UND KÄTHE HOFFMANN. *Euphorbiaceae-Additamentum VI.* Pflanzenreich Heft. 68 (IV. 147, xiv). 81 p. 1919.—In the present supplement the authors give a brief discussion of the relationship and natural sequence of the first 10 tribes of the Euphorbiaceae, followed by a dichotomous key to the tribes, subtribes, and the 198 recognized genera. Numerous additions are recorded for insertion in previously published parts of the monograph of this family. Several plants new to science are described, mostly from Australasia and Brazil; a list of collectors and specimens cited is also given. The new genera, species, varieties, and combinations included are as follows: *Caperonia similis*, *Annesijoa* n. gen. from New Guinea, *A. novoguineensis*, *Mareya spicata* Baill. var. *micrantha* (*Acalypha micrantha* Benth.), *Mareyopsis longifolia* (*Mareya longifolia* Pax), *Clarorivinia grandifolia*, *Blumeodendron borneense*, *B. papuanum*, *Claoxylon lutescens*, *C. glabrifolium* Miq. var. *integrifolium*, *C. Warburgianum*, *C. carolinianum*, *Mallotus batjanensis*, *M. sanguirensis*, *M. Warburgianus*, *M. papuanus* (J. C. Smith) Pax & Hoffm. vars. *genuinus*, *intermedius*, and *glabrescens*, *Alchornea brachygynae*, *Cleidion Minahassae*, *C. membranaceum*, *Macaranga parvibracteata*, *M. pleiostemona*, *M. haplostachya*, *M. polyadenia*, *M. lanceolata*, *M. effusa*, *M. penninervia*, *M. crassistipulosa*, *M. mallotiformis*, *M. villosula*, *M. acuminata*, *M. brunneofloccosa*, *M. carolinensis* Volkens var. *grandifolia*, *M. ovalifolia*, *M. pseudopeltata*, *M. similis*, *M. caudata*, *M. platyclada*, *M. strigosa*, *M. fallacina*, *M. advena*, *M. gracilis*, *Jatropha brevifolia* (*J. gossypifolia* var. *brevifolia* Morong), *Clutia heterophylla* Thunb. var. *disceptata* (*C. disceptata* Prain), *Pausandra quadriglandulosa*, *Cunuria Uleana*, *Neoscortechinia arborea* (*Alcinaeanthus arboreus* Pax & Hoffm.) and var. *parvifolia* (*A. parvifolius* Merrill), *N. Kingii* (*Scortechinia Kingii* Hook. f.), *N. nicobarica* (*S. nicobarica* Hook. f.), *Neomphalea papuana* (*Omphalea papuana*

Pax & Hoffm), *Senefeldera triandra*, *Mabea anadena*, *M. atroviridis*, *M. depauperata*, *M. sub-sessilis* (*M. anomala* Glaziov), *M. Uleana*, *Homalanthus polyadenius*, *Actinostemon depauperatus*, *A. Glaziovii* (*A. grandifolius* Glaziov), and *Sapium Türckheimianum*.—J. M. Greenman.

928. PAX, F., UND KÄTHE HOFFMANN. **Euphorbiaceae-Dalechampieae**. Pflanzenreich Heft 68 (IV. 147, xii). 59 p., 9 fig. 1919.—The genus *Dalechampia* is held by the authors to represent a distinct tribe of the Euphorbiaceae, allied to other members of this family through *Plukenetia* and *Tragia*. The group embraces 88 species, distributed mainly in the American tropics. The following new species, varieties, names, and combinations are included: *Dalechampia panamensis*, *D. madagascariensis* (*D. ternata* var. *madagascariensis* Müll. Arg.), *D. Weberbaueri*, *D. pallida* Klotzsch, *D. micromeria* Baill. vars. *genuina* and *angustifolia*, *D. Bangii*, *D. anomala*, *D. heteromorpha*, *D. stipulacea* Müll. Arg. var. *bogotensis*, *D. Martiana* Klotzsch, *D. Karsteniana*, *D. Uleana*, *D. bidentata* Blume vars. *genuina* and *yunnanensis*, *D. scandens* L. vars. *pernambucensis* (*D. pernambucensis* Baill.), *pseudoclematidis* (*D. pseudoclematidis* Baill.), *Hildebrandtii* Pax (*D. Hildebrandtii* Pax), and *natalensis* (*D. natalensis* Müll. Arg.), *D. Hersogiana*, *D. linearis* Baill. var. *goyazensis* (*D. goyazensis* Müll. Arg.), *D. morifolia*, *D. amambayensis*, *D. rubrivenia*, *D. trichophila*, *D. serrula*, *D. Schenckiana*, *D. boliviano*, *D. tenuiramea* Müll. Arg. vars. *genuina* and *cynanchoides* (*D. cynanchoides* Moore), *D. ulmifolia* Chod. & Hassl. vars. *genuina* and *Grüningiana* Pax (*D. Grüningiana* Pax), and *D. parvula*.—J. M. Greenman.

929. PAX, F., UND KÄTHE HOFFMANN. **Euphorbiaceae-Pereae**. Pflanzenreich Heft 68 (IV. 147, xiii). 14 p., 2 fig. 1919.—The authors interpret *Pera* as representing a distinct tribe of the Euphorbiaceae, and recognize about 20 species all of which are trees or shrubs occurring in the American tropics. One new species is described and 1 new combination made, namely, *Pera Glaziovii* Taubert and *P. barbinervis* (*Spixia barbinervis* Mart.).—J. M. Greenman.

930. PITTIER, H. **On the species of Dalbergia of Mexico and Central America**. Jour. Washington [D. C.] Acad. Sci. 12: 54-64. 1922.—Eight new species, as follows, are described: *Dalbergia melanocardium*, *D. congestiflora*, *D. tabascana*, *D. cibiz*, *D. mexicana*, *D. hypoleuca*, *D. granadillo*, and *D. lineata*. *D. cubilquitzensis* (Donn. Smith) Pittier is added, and a key for all the known species of the region is published. In addition to the new species, the following are included in the key: *D. tucurensis* Donn. Smith, *D. glomerata* Hemsl., *D. campecheana* Benth., *D. Brownei* (Jacq.) Urban, *D. ecastophyllum* (L.) Taub., *D. monetaria* L., *D. calycina* Benth., *D. retusa* Hemsl.—Helen M. Gilkey.

931. ROSENTHAL, KÄTHE. **Daphniphyllaceae**. Pflanzenreich Heft 68 (IV. 147a). 16 p., 1 fig. 1919.—The author reinstates the family Daphniphyllaceae, as distinct from the Euphorbiaceae, and refers to it the single genus *Daphniphyllum* which comprises 24 known species, endemic in southeastern Asia. The following new species, combinations, and varieties are included: *Daphniphyllum celebense*, *D. nilgherrense* (*Gouphia nilgherrensis* Wight) and var. *concolor* (*D. glaucescens* var. *concolor* Müll. Arg.), *D. Oldhamii* (*D. glaucescens* var. *Oldhami* Hemsl.), *D. macropodium* Miq. var. *humile* (*D. humile* Maxim.), *D. bengalense*, *D. chartaceum*, *D. latifolium*, *D. Paxianum*, *D. longeracemosum*, and *D. gracile*.—J. M. Greenman.

932. TRELEASE, WILLIAM. **The peltate peperomias of North America**. Bot. Gaz. 73: 133-147. Pl. 1-4. 1922.—An historical account of the taxonomy of the peltate peperomias is given together with a synopsis of the group. The latter presents the species in 8 subgenera which are arranged in 4 groups. The following new species appear: *Peperomia Painteri*, *P. astyla*, *P. Parryana*, *P. tenuimucronata*, *P. schizandra*, *P. amphoricarpa*, *P. schizostachya*, *P. Killipi*, *P. cordulatiformis*, *P. peltitimba*.—B. W. Wells.

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12

FEBRUARY, 1923

No. 2

ENTRIES 933-1531

AGRONOMY

C. V. PIPER, *Editor*

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(See also in this issue Entries 1033, 1046, 1048, 1052, 1058, 1062, 1064, 1116, 1229, 1292, 1302, 1368, 1419, 1420, 1423, 1427, 1447, 1461, 1473, 1476, 1478, 1479, 1489, 1490, 1493, 1495, 1497, 1512)

933. ANONYMOUS. Candle-nut oil. Agric. Bull. Federated Malay States 9: 176. 1922.—A description is given of the process of extracting oil from the candle-nut.—I. H. Burkill.

934. ANONYMOUS. Napier fodder. Rhodesian Agric. Jour. 19: 194-199. 1922.—Extracts are given of reports from various sources of elephant grass (*Pennisetum purpureum* Schumacher (*P. Bentharii* Steudel)), the Napier fodder of Rhodesia. Napier fodder, which attains a height of 15-18 feet, shows an aptitude for growing on poor soil and though not as palatable as many other well known grasses, cattle do well on it. Records show that cows fed on Napier fodder and allowed to graze occasionally on natural pastures maintain milk yields and butter fat tests. Pulp from which good quality paper is manufactured has been obtained in Uganda from Napier fodder although at present export of the raw material would be unprofitable.—L. J. Goldblatt.

935. ANONYMOUS. Pasture plants and grasses in Rhodesia. Results of further trials. Rhodesia Agric. Jour. 19: 439-443. 1922.—Reports, compiled by the Chief Agriculturist, are given from farmers who tested the following: Rhodesian tussock grass, Penhavanga grass, Kikuyu, Kudzu vine, swamp couch grass, Buffel grass, *Paspalum dilatatum*, Napier fodder, *Phalaris bulbosa*, native Paspalum, and Florida beggar weed.—L. J. Goldblatt.

936. ANONYMOUS. Varieties of maize. Recommendations by the Department of Agriculture. Agric. Gaz. New South Wales 33: 549-551. 1922.—Twelve maize districts are given for New South Wales. Maize varieties are grouped geographically relative to earliness of the variety, use of the crop, and character of the soil.—L. R. Waldron.

937. ANONYMOUS. Varieties of potatoes. Recommendations by the Department of Agriculture. Agric. Gaz. New South Wales 33: 552. 1922.—Varieties for New South Wales are classified geographically and according to earliness.—L. R. Waldron.

938. ARNOLD, H. C. Propagation of Kudzu vine (*Pueraria Thunbergiana*). Rhodesia Agric. Jour. 19: 435-438. 1922.—Kudzu vines may be propagated either from seed or by rooted layers from the parent stock. In the latter case much less labor is entailed if unrooted slips are detached from the parent stock and planted in the permanent site. When the plant has become established, runners are sent out in all directions; in order to prevent patchiness these should be buried 1-2 inches as they grow, and within a foot of the growing tips.—L. J. Goldblatt.

939. BOSMAN, G. J. Potato culture. Jour. Dept. Agric. Union South Africa 5: 41-49. 1922.—An outline is given of the origin, history, and importance of the potato. The following points in potato culture are dealt with: climatic adaptations; soil requirements and preparation; planting; cultivation; manurial requirements; rotation; the seed; and the improvement of the stock.—L. Goldblatt.

940. BREAKWELL, E. Some useful introduced fodder plants. Agric. Gaz. New South Wales 33: 485-490. 2 fig. 1922.—Notes and descriptions are given for tagasaste (*Cytisus proliferus*), sainfoin (*Onobrychis sativa*), sulla (*Hedysarum coronarium*), teosinte (*Euchlaena luxurians*), Japanese clover (*Lespedeza striata*), Kudzu (*Pueraria Thunbergiana*), and sheep's burnet (*Poterium sanguisorba*). These plants are not commonly grown in New South Wales.—L. R. Waldron.

941. BREAKWELL, E. Some useful saltbushes. Agric. Gaz. New South Wales 33: 571-577. 7 fig. 1922.—Saltbushes of Australia belong mainly to the following 5 genera,—*Chenopodium*, *Atriplex*, *Kochia*, *Rhagodia*, and *Euchlaena*. Because of free-seeding and rapid-growing habits, ranging tracts carrying saltbushes are quickly brought to use after periods of drought. *Chenopodium atriplicinum* attains a height of 3-4 feet. *Atriplex nummularia* produces fodder in comparative abundance. Transplanted seedlings grew to a height of 10 feet at Nyngan during the summer of 1921-22 and 56 pounds of green feed per plant were obtained. Plants should be planted 12 feet apart. *A. leptocarpa* is not very palatable. *A. semibaccata* has been introduced successfully into California. Analyses are given of *A. nummularia*, *A. halimoides*, *A. angulata*, *Rhagodia parabolica*, and *R. hastata*.—L. R. Waldron.

942. BRUTSCHKE, FRITZ. Zur Förderung der landwirtschaftlichen Erzeugung. [Increasing agricultural production.] Mitteil. Deutsch. Landw. Ges. 37: 521-522. 1922.—A general plea is made for greater production and for economy in the use of seed.—A. J. Pieters.

943. BURTT DAVY, JOSEPH. Fermentation products from maize. South African Jour. Indust. 5: 245-254. 1922.—This article describes the use of maize starch in the production of fermented liquids, such as, beer, whisky, gin, brandy, vinegar, and especially industrial alcohol. Details of the manufacture and the various uses of the latter are very fully given.—Sydney M. Stent.

944. BURTT DAVY, JOSEPH. Starch and glucose from maize. 2 and 3. South African Jour. Indust. 5: 177-183, 217-222. 1922.—The process is described whereby starch is extracted from the grains of maize (*Zea Mays* L.) and converted into glucose. Various useful commodities are cited into the composition of which glucose largely enters.—Sydney M. Stent.

945. BURTT DAVY, JOSEPH. The uses of maize husks, cobs and chaff. South African Jour. Indust. 5: 407-413. Pl. 3. 1922.—The author describes the employment of maize husks in the manufacture of hats, mats, and other articles of domestic use; also the manufacture of gas for illuminating and heating purposes, pipes, charcoal, and stock-food from the cobs.—Sydney M. Stent.

946. BURTT DAVY, JOSEPH. Utilization of maize flowers, stalks and leaves 2. South African Jour. Indust. 5: 357-364. 1922.—This installment contains further information

regarding the utilization of maize stalks as a source of sugar, and refers to the published results of experiments by Stewart and Kerr, Blackshaw, and others on the possibility of increasing the sugar-content of the stalk. The use of maize straw in the manufacture of paper is also dealt with in detail.—*Sydney M. Stent.*

947. CLIFFORD, WALTER. Straw pulp as a substitute for groundwood for newsprint. *Paper Indust.* 3: 1105-1106. 1921.—The author urges the utilization of straw in place of wood and gives a description of a sulphate process for cooking straw.—*H. N. Lee.*

948. DAWSON, C. A. Crop production on small holdings 5. Lucerne. *South African Fruit Grower* 9: 127-129. *Fig. 1-4.* 1922.—Lucerne is considered the most suitable crop for extensive field culture under irrigation wherever soil and climatic conditions are suitable to its production.—*L. Goldblatt.*

949. DAWSON, C. A. Crop production on small holdings 6. Beans. *South African Fruit Grower* 9: 173. 1922.—Beans are usually grown as a green vegetable rather than for the dry seed, though the 2 could profitably be combined. For export, white beans are preferable to colored varieties. To prevent weevil infestation, dry beans should either be fumigated with carbon bisulphide or mixed with $\frac{1}{3}$ as much air-slaked lime, agricultural lime, or fine dry dust, followed by washing and sifting.—*L. Goldblatt.*

950. DOUGLASS, J. Field experiments with maize. Wollongbar experiment farm. *Agric. Gaz. New South Wales* 33: 464. 1922.—Maize from graded seed, planted as a fodder crop, outyielded similar ungraded seed by nearly 5 tons of green fodder, about 50 per cent per acre.—*L. R. Waldron.*

951. DOWNING, R. G., and L. G. LITTLE. Field experiments with oats. Nine years' results, 1912 to 1920. Glen Innes experiment farm. *Agric. Gaz. New South Wales* 33: 465-468. 1922.—Notes and yields are given for 12 varieties. Algerian is considered the best general variety. Fulghum variety shows promise; Kherson is not satisfactory; and a hull-less variety has proved to be of little value. Late varieties, represented by White Tartarian, have only limited application.—*L. R. Waldron.*

952. DOWNING, R. G., and L. G. LITTLE. Field experiments with oats. Results of seven years' trials with fertilizers. Glen Innes experiment farm. *Agric. Gaz. New South Wales* 33: 609-613. 1922.—In a 3-year rotation, oats, pasture crop, and maize for silage, fertilizers were applied to the oats at time of planting. The fertilizers—sulphate of ammonia or dried blood, superphosphate, and sulphate of potash—were used singly and variously combined in comparison with check plots. Any combination, without superphosphate, had only slight effect. Fertilizers were applied at the rate of $2\frac{1}{2}$ pounds of nitrogen, 15 pounds phosphoric acid, and 6 pounds potash per acre. Best results were obtained with a complete fertilizer, which increased the yield per acre nearly 40 per cent over the check plot. The annual net monetary gain per acre brought about by the use of a complete fertilizer was \$7.32 in the production of oat hay and \$5.76 for threshed oats.—*L. R. Waldron.*

953. EATON, B. J., F. DELA M. NORRIS, D. H. GRIST, and J. N. MILSUM. [Editors.] *Malayan agriculture.* Dept. Agric. Federated Malay States and Straits Settlements: Kuala Lumpur, 1922.—The handbook indicates the present condition of agriculture in the Malay Peninsula and discusses plans for its improvement.—*I. H. Burkill.*

954. FALKE. Die Bewirtschaftung der Wiesen und Weiden. [The management of meadows and pastures.] *Arbeit. Deutsch. Landw. Ges.* 314. 54-79. 1921.—About $\frac{1}{3}$ the area of cultivated land in Germany is in meadows; the average yield is about 5000 pounds per acre. This low average yield forms the text for a discussion of methods of improving the meadows. The 1st part of the paper is virtually a review of one by Ahr on the fertilizing of

meadows [see Bot. Absts. 9, Entry 285]. The relative merits of seeding on old meadows or plowing and re-seeding are discussed and 3-, 4-, and 5-year rotations are suggested, together with grass and clover seed mixtures for wet, moist, and dry lands. In the 2nd section the author discusses fertilizing pastures, utilization of feed produced, and gives tables and graphs showing gains made by young cattle on stable feed and on pastures, both with and without concentrates. The treatment of sheep pasture is discussed, and grass mixtures for lamb pastures are suggested.—*A. J. Pieters.*

955. GEORGI, C. D. V. Some plant oils of Malaya, their extraction and uses. *Malayan Agric. Jour.* 10: 34-42. 1922.—The oil-yielding plants of the Malay Peninsula are discussed.—*I. H. Burkill.*

956. GOW, C. Wild oats. *Agric. Gaz. New South Wales* 33: 541-544. 1922.—Practical notes on control are given for *Avena fatua*.—*L. R. Waldron.*

957. GRIST, D. H., and SYED ABDUL RAHMAN. The cultivation of Tenggala padi. *Agric. Bull. Federated Malay States* 9: 5-22, 131-153. 1921.—Tenggala padi is rice planted in a rotation on ploughed land, tenggala meaning a plough. The method is the most scientific one used by the Malays. The most common rotation is 4 years cropping and 4 years fallow. The processes of the rotation are described. Improvement must proceed along 3 lines, (a) improvement of the races of rice, (b) manuring for the rejuvenation of the land, and (c) improvement in the methods of manipulation. Catch crops and cover crops are then considered and experiments with them described.—*I. H. Burkill.*

958. GUTHRIE, F. B., and G. W. NORRIS. Notes on wheats entered for the Royal Agricultural Society's show. Easter, 1922. *Agric. Gaz. New South Wales* 33: 497-504. 1922.—One hundred entries were distributed among 11 classes. The wheat variety Quality, from California, had maximum weight of 68 pounds per bushel. Florence stood highest in percentage of flour produced, and Cedar ranked highest in per cent gluten and water absorption. A table is appended giving weight, gluten, and flour strength for the show wheats since 1905.—*L. R. Waldron.*

959. HALL, E. H. Sulphur and nitrogen content of alfalfa grown under various conditions. *Bot. Gaz.* 73: 401-411. 1922.—The analytical method in sulphur analysis used was the "peroxide method" described in the U. S. Bureau of Chemistry Bulletin No. 107. For the sulphate sulphur the Ames method was employed. Total nitrogen was determined by the Arnold-Gunning method and nitrate nitrogen by Koch's modification of the Schlesing-Wagner method. The writer's summary of results is as follows: Alfalfa hay grown in various parts of the U. S. A. shows considerable difference in the percentage of total sulphur content, quite independent of sulphur fertilization. In general, hay from fields with the heaviest crop contains the highest percentage of sulphur. Good to excellent crops of alfalfa hay remove annually from 37 to 90 pounds of sulphur per acre, an amount which would seem far in excess of the amount returned by rain. In some samples all, and in every sample more than 90 per cent, of the total sulphur was in organic form. There was none or little sulphur present in excess of the actual needs as building material.—*B. W. Wells.*

960. HENRICK, J. O. The cultivation of rye. *Agric. Gaz. New South Wales* 33: 483-484. 1922.—The average annual rye acreage in New South Wales is less than 4000. It is used mainly for early winter feed in areas low in production and as a green manure crop on very poor soils. Cultural notes are given.—*L. R. Waldron.*

961. HOUSER, TRUE. New cigar tobacco varieties. *Monthly Bull. Ohio Agric. Exp. Sta.* 6: 135-138. 1921.—A large number of new varieties of tobacco have been bred and tested during the past 18 years at the Ohio Agricultural Experiment Station. Montgomery Seedleaf (hybrid 199), Tall Zimmer (hybrid 224), and Ohio Binder (hybrid 77) have met with much

favor. Characteristics and merits of each variety and tables showing production records are given.—*R. C. Thomas.*

962. HUTCHESON, T. B., and T. K. WOLFE. Silage experiments. Virginia Agric. Exp. Sta. Bull. 227. 16p. 1922.—Silage crops included in the tests were corn, sorghum, soy beans, cowpeas, and millet. Corn and soy beans were superior to the other crops from the standpoint of highest yields of tonnage and total nutrients. Soy beans outyielded corn on the basis of total nutrients, but used alone did not make good silage. It was found that the best silage is obtained with a mixture of soy beans and corn, not more than 1 part of soy beans to 1 part of corn. The 2 crops may be grown together or in separate fields. The best corn varieties for silage purposes are Coker's Prolific, Virginia Ensilage, and Pamunkey Ensilage. The best soy bean varieties for the separate sections of the state are those varieties best adapted for hay production in the section.—Information on culture and harvesting are included.—*F. D. Fromme.*

963. JURITZ, C. F. Prickly pear as a fodder for stock. Union South Africa Dept. Agric. Sci. Bull. 16. 15p. 1920.—Prickly pear is of some value as an accessory food supply during periods of drought, while at other times it is of advantage as a roughage for cattle and ostriches. A number of analyses are given of the green plant, air-dry plant, and fruit. It is not a suitable constituent for ensilage. The spines may be singed off before feeding. A summary is given of experiments with prickly pear as a stock feed in India and Australia. *E. M. Doidge.*

964. JURITZ, F. The nicotine-content of South African tobacco. Jour. Dept. Agric. Union South Africa 4: 552-562, 1922; also South African Jour. Indust. 5: 347-356. 1922.—With the idea of establishing a tobacco extract factory in the Piet Retief district, tables are given of the analyses of tobaccos from different districts. The tobaccos are classed as "heavy" or "light" according to the amount of nicotine contained. The conclusions drawn from the series of investigations are: (1) The heavy South African tobaccos contain in their air dried leaves from 3 to 5 per cent of nicotine; (2) the lighter tobaccos do not as a rule yield much above 2 per cent and frequently fall below 1 per cent; (3) the leaves of the common wild tobacco (*Nicotiana glauca*) apparently contain considerably below 1 per cent nicotine; (4) the most promising results are those obtained from *N. rustica*, the leaves of which have yielded as much as 6 and 8 per cent and even more of nicotine. All parts of the plant contain nicotine, but it is found mainly in the leaves.—*L. Goldblatt.*

965. KERLE, W. D. Farmers' experiment plots. Maize experiments, 1921-22. Upper north coast district. Agric. Gaz. New South Wales 33: 617-621. 1922.—Cooperative trials were conducted upon 9 private farms. The variety Craig Mitchell gave the maximum yield of 84 bushels. Mineral fertilizers gave markedly increased yields over no fertilizer in most cases.—*L. R. Waldron.*

966. KOCH, PIETER. Conservation of soil moisture in relation to Turkish tobacco culture. Jour. Dept. Agric. Union South Africa 4: 319-328. Fig. 1-6. 1922.—In the Western Province, Turkish tobacco is grown as a dry land crop. Owing to the hot and dry climate during the growing season soil moisture must be conserved. This is done by deep ploughing in early winter; by maintaining the productivity of the soil; by increasing the humus content by ploughing in a green crop or stable and kraal manures at least every 4th season; and by frequent and proper cultivation after the crop has been planted. In an appendix the rainfall recorded at Elsenburg during 1919 and 1921 and the average for 17 years are given.—*L. Goldblatt.*

967. LEMMERMANN. Neuzeitliche Düngungsfragen. [Modern fertilizer questions.] Arbeit. Deutsch. Landw. Ges. 314. 80-100. 1921.—The author points out that during the 25 years prior to 1913 the yields of potatoes and grains increased because of the increased use

of fertilizers. From 1913 to 1919 yields declined as follows; bread grains 21.3 per cent, fodder grain 24.2 per cent, potatoes 31 per cent. Besides discussing the use of fertilizer, the author mentions the effect of light on plant growth and advises that drill rows be made north and south so as to receive most light. He reviews the work of Borneman and of himself on fertilizing with carbon dioxide [see Bot. Absts. 8, Entry 32], but the main part of the paper is concerned with a discussion of the profitability of using nitrogen, phosphoric acid, and potash at prevailing prices of fertilizers and of grains.—*A. J. Pieters.*

968. LITTLE, L. G. Field experiments with sunflowers. A comparison with maize for silage. Glen Innes experiment farm. Agric. Gaz. New South Wales 33: 622-624. 1922.—Each crop was sown at the rate of 15 pounds of seed per acre in 35-inch rows using 70 pounds of superphosphate per acre. Sunflowers were cut in full flower and maize at the best silage stage. Sunflowers yielded 7 tons and maize 3.8 tons per acre. According to analyses of the silage, maize carried more water, less protein, less ether extract, and more fiber than the sunflowers.—*L. R. Waldron.*

969. McCauley, C. Field experiments with wheat, 1921. Cowra experiment farm. Agric. Gaz. New South Wales 33: 545-548. 1922.—Wheat was planted both early and late for grain and hay. Cowra No. 29 yielded highest for grain in the early planting, and in the late planting trial, Canberra held this rank in grain production.—*L. R. Waldron.*

970. MAINWARING, C. The common sunflower (*Helianthus annuus*). Rhodesia Agric. Jour. 19: 295-301. Fig. 1-2. 1922.—The chemical composition and the methods of cultivation of the sunflower are given. The sunflower is a dry-land crop and is more resistant to heat and drought than maize. Where the first consideration is to produce a crop either for cash or for feeding purposes, maize is considered more profitable, especially in the richest districts; but in drier portions of Rhodesia sunflowers are more likely to flourish and prove profitable.—*L. J. Goldblatt.*

971. MAINWARING, C. The ground nut or monkey nut. Rhodesia Agric. Jour. 19: 150-158. Pl. 1-4. 1922.—The author discusses the cultivation of *Arachis hypogaea*. Climatic conditions over the whole of Rhodesia are favorable for its growth. Spanish Bunch and Virginia Bunch have proved superior croppers and best suited to local conditions over a number of seasons. The oil, which is obtained in large quantities, is used in the preparation of food stuffs, leather dressing, furniture creams, hair and cosmetic oils, etc., and for illumination. Shelled ground nut oil-cake contains 10 per cent of fat and 46 per cent of albuminoids (protein), thus making it a highly concentrated cattle feed.—*L. J. Goldblatt.*

972. MASCHHAUPT, J. G. De invloed van grondsoort en bemesting op het gehalte onzer landbouwgewassen aan stikstof en aschbestanddeelen. [Influence of soil and fertilizing on nitrogen and ash constituents.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 25: 115-130. 1921.—In these experiments of 1918, winter wheat was used on experimental plots representing 5 kinds of soil,—heath sand, peat-moor, marsh soil, gravel-sand, and clay soil. Whereas the influence of nitrogen fertilizers on nitrogen and ash of the plants had been studied earlier, the present investigations were on the influence of potassium and phosphoric acid fertilizers. Four procedures were used: (1) nitrogen only, (2) complete fertilizer (nitrogen, potassium, phosphorus), (3) nitrogen and potassium, (4) complete fertilizer with double portion of potassium. The following observations were made: The greatest weight (79.63 kgm.) per hectoliter wheat was obtained from marsh soil, the smallest (76.58 kgm.) from gravel-sand; the weights from peat-moor, heath sand, and clay were respectively 78.36, 77.16, and 77.14 kgm. Soil seems to have a distinct influence on weight of the grain. Grain from marsh soil was glassy and from gravel-sand, mealy,—a difference undoubtedly connected with the high nitrogen content of the former and the low nitrogen content of the latter. Doubling the potassium in the complete fertilizer was without effect. In heath sand, just as much N and K₂O were taken out of the soil as were added in the fertilizers, whereas in the other soils

much more was taken out than put in. Less than half the added phosphorus was taken out. The amounts of silica taken from gravel-sand and clay are considerable. Much less N is taken up than is usually supposed.—In another experiment, a higher calcium carbonate content of the soil had no influence. Beets grown on "young" clay rich in CaCO_3 had a higher N, P_2O_5 , MgO, and K_2O content, a very much higher Cl and Na_2O content, but a much lower CaO content than those grown on "older" clay soil containing less CaCO_3 . The same relation was found by an analysis of oat plants grown on "schuimaarde" (approximately $\frac{1}{4}$ of which is CaCO_3) and "old" clay soil. A very much greater nitrogen content was found, partly as nitrates and partly as ammonia. The CaO contents in comparison with other constituents were quite low. MgO was taken up in relatively increased amount, as was nitrogen.—A German résumé concludes the paper.—*Peter J. Klaphaak.*

973. MOE, CARL. Utilization of lime sludge. Paper 29¹¹: 11-12. *Fig. 1-2*. 1921.—Lime sludge from a sulphate pulp mill gave very much better results than commercial limestone when applied to fields in preparation for planting of corn and clover.—*H. N. Lee.*

974. MOOMAW, LEROY. Report of the Dickinson substation for the years 1920 and 1921. North Dakota Agric. Exp. Sta. Bull. 160. 32 p. 5 fig. 1922.—Results of 13 years' cropping are given for spring wheat, oats, and barley on disced corn ground; on spring-plowed grain-stubble land in comparison with fall-plowed; after clean fallowed land; and following a green manuring crop. The following are the respective average yields for spring wheat from the 5 methods: 18.7, 15.2, 15.6, 21.1, and 16.8, bushels per acre. The use of a bare summer fallow has not been justified and the use of a green manuring crop has shown no positive results.—Wheat continuously cropped for 13 years averaged 13 bushels per acre in comparison with 22.5 bushels from wheat alternately cropped with summer fallow.—During 15 years, including 1 year of hail loss, shelled corn has averaged 11.3 bushels per acre. The average for 8 of these years, when corn was mature enough to husk, was 21.2 bushels.—Monad and Kubanka durum wheats have significantly outyielded the best varieties of common wheats. The best varieties of winter wheat have yielded considerably less than varieties of common spring wheat.—Dakold rye is more productive than other varieties.—Midseason oats have outyielded early and late varieties.—The 2-rowed barleys Hannchen and Swan Neck [Svanhals] have outyielded all 6-rowed varieties.—Proso millet is less productive than other grain crops.—Notes and yields are given of grasses, alfalfa, field peas, roots, and other forage crops.—In a 5-year test Burbank and Irish Cobbler outyielded other potato varieties.—*L. R. Waldron.*

975. NEWTON, W. Why grow sweet clover? Agric. Jour. [British Columbia] 7: 106. 1922.—Sweet clover has not given very good results in the coast regions, perhaps because the soils are usually slightly acid. It is better adapted to conditions in the interior of the province.—*J. W. Eastham.*

976. OLSON, EDGAR. The demonstration farms, 1921. Sixteenth annual report. North Dakota Agric. Exp. Sta. Bull. 163. 54 p. [1922].—Detailed yields and culture methods, with costs of production, are given for 20 demonstration farms for 1921. The crops dealt with are durum and common wheat, oats, barley, corn, flax, potatoes, alfalfa, and sweet clover. A 10-year summary of results is given for the Lakota farm. Alfalfa on this farm has made a greater net return than any other crop, including wheat.—*L. R. Waldron.*

977. OOSTHUIZEN, J. DU P. Different methods of curing tobacco. Jour. Dept. Agric. Union South Africa 5: 131-150. *Fig. 1-12*. 1922.—The article discusses the different methods of curing tobacco (air-curing, sun-curing, fire-curing, and flue-curing) and its preparation for market. Most of the tobacco grown in the Union is air-cured, which is hazardous because of the weather. The quality of the tobacco produced in the Union can be improved, although the value of good quality leaf is sometimes reduced during curing. The climate of South Africa is favorable for air-curing, although during the wet seasons much better results could be obtained by the use of artificial heat in air-curing or by flue-curing.—*L. Goldblatt.*

978. PARISH, E. **Agricultural experiment, its design and interpretation.** Union South Africa Dept. Agric. Sci. Bull. 22. 21 p. 1922.—The variation in yield of single plots similarly treated is so great as to render valueless comparisons made from the result of single plot trials; similarly with experiments with small numbers of animals, owing to the high variation of the individual. Replication in agricultural experiments is absolutely necessary. In field trials the replication of the plots must be systematic and so designed as to obviate the effect of progressive differences in the soil; no appreciable increase in reliability is gained by enlarging plots beyond $\frac{1}{4}$ of an acre.—*E. M. Doidge.*

979. PARISH, E. **Causes of the high cost of production of maize and the remedy.** Jour. Dept. Agric. Union South Africa 4: 417-429. Pl. 1-3. 1922.—The high cost of maize production may be considered under the following heads, for each of which the remedy is given: (1) low yields; (2) high cost of labor and high cost of grazing of oxen, costly methods of ploughing, and method of payment of native labor; (3) lack of diversity of crops resulting in an uneconomical use of labor; (4) high cost of management; (5) over capitalization in land or men resulting in excessive overhead charges; (6) farming on borrowed capital at high rates of interest; (7) non-use of fallows and winter-ploughing system of farming; (8) faulty utilization of farm products; (9) other considerations including area of land worked per implement; life of implements; investment per 100 acres of maize; and ingenuity.—*L. Goldblatt.*

980. PHILLIPS, E. P. **A possible cattle food (seeds of *Sesbania cinerascens* Melw. and *S. mossambicensis* Klotz.).** Jour. Dept. Agric. Union South Africa 4: 361-365. Fig. 1. 1922.—Twenty-three species of *Sesbania* are recorded in Africa, of which 6 occur in South Africa. Chemical analyses are given of *S. mossambicensis* and *S. cinerascens*, which have possibilities as feeding stuffs of high feed value if they prove harmless to animals. Merchants report that *S. mossambicensis* might be utilised in place of peas, lentils, and millet.—*L. Goldblatt.*

981. PITT, J. M. **Farmers' experiment plots. Potato trial, 1921-22. Central coast.** Agric. Gaz. New South Wales 33: 471-475. 1 fig. 1922.—Cooperative experiments were conducted by 13 farmers. Application of phosphatic fertilizers gave an economic increase of yield. Varieties Carman and Up-to-date gave comparatively high yields. Spacing and size-of-tuber experiments were conducted on 1 farm.—*L. R. Waldron.*

982. POLE EVANS, I. B., and K. A. LANSDSELL. **The Galinsoga weed (*Galinsoga parviflora* L.).** Union South Africa Dept. Agric. Bull. 1920⁷: 1 pl. 1920.—The plant is described and illustrated by a colored plate.—*E. M. Doidge.*

983. POLE EVANS, I. B., and K. A. LANSDSELL. **The purple stinkweed (*Datura tatula*).** Union South Africa Dept. Agric. Bull. 1920⁸: 1 pl. 1920.—The plant is described and illustrated by a colored plate.—*E. M. Doidge.*

984. POLE EVANS, I. B., and K. A. LANSDSELL. **The sow thistle (*Sonchus oleraceus*).** Union South Africa Dept. Agric. Bull. 1920⁸: 1 pl. 1920.—The plant is described and illustrated.—*E. M. Doidge.*

985. POLE EVANS, I. B., and K. A. LANSDSELL. **The upright star-burr (*Acanthospermum hispidum* D.C.).** Union South Africa Dept. Agric. Bull. 1920⁸: 1 pl. 1920.—The plant is described and illustrated by a colored plate. Means of eradication are suggested.—*E. M. Doidge.*

986. PRIDHAM, J. T. **Climate in our relation to our wheat.** Agric. Gaz. New South Wales 33: 469-470. 1922.—Certain areas of New South Wales are suitable for successful growth of semi-hard wheats such as Hard Federation. Since such varieties bring better prices overseas it is suggested that farmers might capitalize this fact where climatic conditions warrant.—*L. R. Waldron.*

987. PRIDHAM, J. T. Oats on the wheat farm. *Agric. Gaz. New South Wales* 33: 615-616. 1922.—Storage of oats on farms is discussed.—*L. R. Waldron.*

988. RINDL, M. Mafura tallow. A product of the nuts of *Trichilia emetica*. *South African Jour. Indust.* 5: 415-423. 1922.—Mafura nuts are a valuable potential oil seed of which fairly large quantities are available from trees growing wild in Portuguese East Africa. The possibility of profitably cultivating the tree in places easily accessible by rail or barge is suggested. The high melting point of the tallow makes it valuable for the candle industry, but its value as a soap stock, as well as for food and other purposes, still needs investigating. The entire export of this nut from Portuguese East Africa in 1913 was valued roughly at £45,000.—*Sydney M. Stent.*

989. RITTER, KURT. Deutschlands Wirtschaftslage und die Produktionssteigerung der Landwirtschaft. [The economic condition of Germany and the increase in agricultural productivity.] *Landw. Jahrb.* 57: 285-397. 1922.—A detailed study of the present economic condition in Germany is presented with the conclusion that only an increased agricultural productivity will save Germany in the next few years from famine. The author discusses in detail the condition of agricultural economy in relation to an increase in productivity and suggests means for bringing about the latter.—*Selman A. Waksman.*

990. SCHOLER, J. K. Field experiments with wheat, 1921. Coonamble experiment farm. *Agric. Gaz. New South Wales* 33: 477-482. 1922.—Trials were duplicated on the farm upon red and black soils. Varieties sown on the heavy black soil of the open plain country had their yields much reduced because of attacks of rust [*Puccinia graminis*]. Varieties sown on the red sandy loam of the wilga and pine country did not suffer from rust attacks.—*L. R. Waldron.*

991. SEELHORST, VON. Ackerbaufragen. [Problems in field culture.] *Arbeit. Deutsch. Landw. Ges.* 314. 3-24. 1921.—The author discusses the problems of green manuring, artificial fertilizers, and cultivation with various tools and machines.—*A. J. Pieters.*

992. SHEPHERD, A. N. Farmers' experiment plots. Green fodder trials, 1921-22. Murrumbidgee irrigation areas. *Agric. Gaz. New South Wales* 33: 639-641. 1922.—Notes are given on manurial and variety trials with maize, sorghum, and Sudan grass.—*L. R. Waldron.*

993. SHEPHERD, A. N. Fodder crops for dairy farmers. Murrumbidgee irrigation area. *Agric. Gaz. New South Wales* 33: 625-628. 1922.—Practical cultural notes are given for various fodder crops for the region indicated.—*L. R. Waldron.*

994. SKIBBE, ARTHUR, and JACQ P. F. SELLSCHOP. Some fodder plants and feeding stuffs. Their culture and chemical composition. *Jour. Dept. Agric. Union South Africa* 4: 338-349. Pl. 1. 1922.—The results are given of experiments conducted at Potchefstroom on the adaptability of various uncommon forage crops to the soil and climate of this area of the Transvaal. The description, uses, etc., and tables showing the chemical composition and cultural methods are given of the following: Dhal bean (*Cajanus indicus*), chick pea (*Cicer arietinum*), Sesbania (*Sesbania aculeata*), Tepary beans (*Phaseolus acutifolius*), tick bean (*Vicia Faba*), peanuts or monkey-nuts (*Arachis hypogaea*), Sudan grass (*Sorghum sudanense*), and Napier fodder (*Pennisetum purpureum*).—*L. Goldblatt.*

995. SOUTH, F. W. The possibilities of developing roselle fibre as a cottage or other industry in the F.M.S. *Agric. Bull. Federated Malay States* 9: 23-26. 1921.—The author describes the growth of *Hibiscus Sabdariffa* var. *altissima* and its possibilities as a fiber crop.—*I. H. Burkill.*

996. SPRING, F. G. Cover-crops and clean-weeding. The butterfly pea (*Centrosoma Plumieri*) and giant mimosa (*Mimosa incisa*). *Agric. Bull. Federated Malay States* 9: 169-

174. 1922.—The action of these 2 plants in preventing and in keeping down weeds is described. The Sarawak bean (*Dolichos Hosei*) is more partial to particular soils. *Dolichos biflorus* continues upon the ground for a shorter period.—*I. H. Burkill*.

997. STEVENS, O. A. North Dakota weeds. North Dakota Agric. Exp. Sta. Bull. 162. 44 p., 45 fig. 1922.—Nine pages are devoted to a general discussion of weeds. The remainder of the bulletin is devoted to individual discussion and illustration of 30 important weeds of the state, each considered under description, distribution, habits, and control.—*L. R. Waldron*.

998. TICE, C. Seed-certification work reviewed. Agric. Jour. [British Columbia] 7: 102-103. 1 fig. 1922.—The work done in British Columbia on the certification of seed potatoes in 1921 is summarized.—*J. W. Eastham*.

999. WENHOLZ, H. Alteration of names of maize varieties. Agric. Gaz. New South Wales 33: 544. 1922.—The varieties from the U. S. A. known as Northwestern Dent and U. S. 133 are renamed Sundown and Early Morn, respectively.—*L. R. Waldron*.

1000. WHITTET, J. N. A new method of harvesting grain sorghum seed. Agric. Gaz. New South Wales 33: 556-557. 3 fig. 1922.—Sorghum was harvested and threshed by the reaper-thresher in 1 operation.—*L. R. Waldron*.

1001. WHITTET, J. N. Kikuyu grass (*Pennisetum clandestinum*) in Queensland. Agric. Gaz. New South Wales 33: 578. 1922.—A farmer's note is given on the plant under cultivation.—*L. R. Waldron*.

1002. ZADE. Futterbau und Futterpflanzen Züchtung. [Forage culture and the breeding of forage plants.] Arbeit. Deutsch. Landw. Ges. 314. 43-53. 1921.—This general paper calls attention to the importance of high grade seeds in the production of forage crops. The author mentions several registered strains and discusses the causes for the lack of demand for highly bred forage crop seeds. Some suggestions are made for growing and harvesting grass seed.—*A. J. Pieters*.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See in this issue Entries 1029, 1320, 1348)

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 1034, 1397, 1399)

1003. CHURCH, A. H. Elementary notes on conifers. Bot. Mem. [Oxford] 8. 32 p. 1920.—Fifteen lecture and laboratory schedules are presented.—*E. Philip Smith*.

1004. CHURCH, A. H. Elementary notes on the systematy of angiosperms. Bot. Mem. [Oxford] 11. 71 p. 1921.—This comprises 34 lecture and laboratory schedules, arranged as an introduction to the study of flowers.—*E. Philip Smith*.

1005. CHURCH, A. H. Form-factors in Coniferae. Bot. Mem. [Oxford] 9. 23 p. 1920.—This is arranged as a supplement to a preceding memoir [see Bot. Absts. 12, Entry 1003].—*E. Philip Smith*.

1006. CHURCH, A. H. *Introduction to the systematy of Indian trees.* Bot. Mem. [Oxford] 12. 50 p. 1921.—This contains 16 lecture schedules.—*E. Philip Smith.*

1007. [D., F. A.] *The Dark Ages: a survival in Kentucky.* Nature 109: 669–670. 1922.—This refers to proposed legislation to prohibit teaching of evolution. "A more disastrously retrograde step in education could scarcely be imagined."—*O. A. Stevens.*

1008. ELFORD, P., and S. HEATON. *Practical school gardening.* 2nd ed., 22 p. Clarendon Press: Oxford, 1921. 3s. 6d.

1009. G[ATES], R. R. [Rev. of: (1) FRITCH, F. E., and E. J. SALISBURY. *Botany for students of medicine and pharmacy.* xiv + 357 p. G. Bell and Sons: London, 1921. (2) WOODHEAD, T. W. *Junior botany.* 210 p. Clarendon Press: Oxford, 1922 (see Bot. Absts. 11, Entry 3461). (3) BALLARD, C. W. *The elements of vegetable histology.* xiv + 246 p. John Wiley and Sons: New York; Chapman and Hall: London, 1921.] Nature 109: 773. 1922.—The reviewer regards the first 2 as good, the last as very poor. [See also Bot. Absts. 10, Entries 32, 1602.]—*O. A. Stevens.*

1010. SCHMITT, CORNEL. *Wie ich Pflanze und Tier aushorche.* [How I inquire of plant and animal.] 128 p., 57 fig. Datterer & Co.: München, date?

1011. SCHNEIDER, HANS. *Die botanische Mikrotechnik. Ein Handbuch der mikroskopischen Arbeitsverfahren.* [Handbook of botanical microtechnic.] 2nd ed. of the work by A. ZIMMERMANN of the same title. xii + 458 p., 220 fig. Gustav Fischer: Jena, 1922.—This edition is practically a new book in which the extensive articles on microtechnic published since the appearance of the 1st edition are incorporated. A noteworthy addition is a section on the theory of light stated as briefly as possible for use in practical work. A preliminary chapter deals with the microscope and its use. Part 1 takes up free hand technic; killing and fixing; staining and mounting of plant tissues; and the apparatus used in photographing, counting, and projection of mounted specimens. Part 2 deals with the most important qualitative microchemical methods for testing plant substances; Part 3, with the cell wall; Part 4, with the protoplast and its contents; and Part 5, with special methods for the study of the members of different plant groups.—*Lillian C. Cash.*

1012. STANFORD, E. E. *Some functions of botany in the pharmaceutical curriculum.* Jour. Amer. Pharm. Assoc. 11: 446–449. 1922.—Calling attention to the lack of observation and initiative of the present day students the author emphasizes the value of a course in botany to stimulate and to increase the power of observation for the many research problems confronting workers of today.—*Anton Hogstad, Jr.*

1013. T., R. J. *Strasburger's textbook of botany.* [Rev. of: LANG, W. H. *Strasburger's textbook of botany.* 5th English ed. revised with 14th German ed. by FITTING, H., L. JOST, H. SCHENCK, and G. KARSTEN. xi + 799 p. Macmillan and Co.: London, 1921.] Nature 109: 740–741. 1922.—It is stated that the main defect is the undue compression which various sections have suffered. [See also Bot. Absts. 11, Entry 1101.]—*O. A. Stevens.*

CYTOLOGY

G. M. SMITH, *Editor*

(See in this issue Entries 1011, 1041, 1068, 1178, 1181, 1345, 1441, 1448, 1484)

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEO. D. FULLER, *Assistant Editor*

(See in this issue Entries 1017, 1021, 1024, 1110, 1111, 1120, 1121, 1125, 1131, 1132, 1134, 1171, 1173, 1174, 1186, 1199, 1203, 1205, 1406, 1422, 1452, 1486, 1491)

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 1114, 1269, 1278, 1283, 1314, 1329, 1367)

1014. ANONYMOUS. Pulp and pulpwood decay. *Paper Indust.* 3: 589-593. 1921.—This contribution by the American Paper and Pulp Association gives descriptions of the uses of various preservatives together with results obtained. Sodium fluoride gives the best results, with borax a close second.—*H. N. Lee.*

1015. BLAIR, R. J. Molding of chemical wood pulp with suggestions as to control. *Pulp and Paper Mag.* 20: 429-431. *Fig. 1-4.* 1922.

1016. DALRYMPLE-HAY, R. Report of the Forestry Commission for New South Wales for the year ending June 30, 1921. 18 p. Sydney, New South Wales, 1921.—During the year 1,096 acres were planted at a direct cost of £3,160, and an additional 1,705 acres were prepared for planting. Substantial progress was also made in marking boundaries of State forests, constructing roads and fire breaks, and permanent improvements necessary for administrative purposes. The area of forest under systematic fire protection is 759,000 acres out of a total of 5,194,000 of state forests, plus 1,536,000 acres of timber reserves. During the year 140,944 acres were put under working plans, bringing the total to date up to 875,037, and 36,000 acres of natural forest were treated for regeneration. The gross revenue was £190,742, the administrative expense £57,835, and expenditure on forest works £104,782. The value of imported timber was £2,073,046, and of exported £464,725. Detailed data on all activities and costs are given in a comprehensive series of tables. The total production of native timber was 155,114 M superficial feet, and total consumption 352,882 M. Progress has been made in botanical studies, in securing data on valuable exotics for introduction, and on use of certain woods for pulp. A valuable feature of the report is the graphic summary of the principal data.—*S. B. Show.*

1017. DURLAND, WILLIAM DAVIES. The forests of the Dominican Republic. *Geog. Rev.* 12: 206-222. 1922.—Fully $\frac{3}{4}$ of the 19,000 square miles of the republic can be classed as timberland. The island is rough and rugged with 4 principal mountain ranges, the highest of which attains an elevation of over 8000 feet. Rainfall is heavy (60 inches + per year) and well distributed. The forests are generally tropical in character and, except for a few of the most valuable species, are little known. A generalized type map recognizes the following principal cover types: (1) evergreen hardwood, (2) partly evergreen hardwood, (3) pine, (4) thorn, (5) savanna, (6) mostly deciduous, (7) littoral hardwood. Much of the exploitation has been in the partly evergreen hardwood type, and especially in the pine type. The general characters of each type are described. The pernicious practice of "comico making," or clearing of forest for temporary agricultural use, is of considerable importance in the republic. A partial list of the trees of the island is included.—*S. B. Show.*

1018. ELLIS, L. MACINTOSH. New Zealand Forest Service. Report for the year ending March 31, 1921. 20 p. Wellington, New Zealand. 1921.—The year is characterized as one of stock-taking, of study of conditions and problems, and the creation of the Forest Service for administration of forests and woodlands, which now total 6,800,000 acres. Seven forest

conservation regions have been established. The policy contemplates scientific management, systematic protection, planting on all Crown forest lands, establishment of a forest school, and promotion of research. The Forest Service at present has a force of 97. General reconnaissance of several of the principal mountain ranges was made. Receipts and expenditures are given in detail, and a general summary from 1896 to date showing total revenue at £32,040 per year against £23,570 expense. A total of 2,500,000 acres of timberland has been destroyed by fire; this loss continues at the annual rate of 50,000 acres. A total of 38,461 acres has been planted since 1896. Total production of lumber for the year was 309,162 M superficial feet. It is urgently recommended that all available Crown forest land be dedicated as provisional state forest. Detailed summaries of the afforestation work show special measures taken to protect plantations from fire, that 520,000 trees were planted by ranchers, etc., during the year, while 2,877,000 were planted on state forests on 1,381 acres. Data on export and import of timber are given.—*S. B. Show.*

1019. GRIFFITH-BOSCAWEN, ARTHUR, and G. G. LEVESON GOWER. *The Ninety-ninth Report of the Commissioners of H. M. Woods, Forests and Land Revenues [Great Britain] for the Year ending March 31, 1921.*—The total income for the year was £11,234, 645, of which £100,494 was from timber, the balance from agricultural and house property, mines, interest, etc. The expenditures were £549,314, of which £68,365 was for planting and preparation of timber for sale. In accordance with various acts of Parliament, expenditures, incomes, leases, rents, etc., are given in great detail. There is no information of consequence on progress of forestry; the report gives only business details.—*S. B. Show.*

1020. HOWE, C. D. *The performance of culled acre.* Paper 27²³: 11-13. 1921.—In 1 acre taken as an average sample of a large area the following conditions have been determined. About 50 years ago 5 white pine trees yielded 2,500 feet of lumber. There is no white pine in any stage of growth now. Two cuttings 26 and 16 years ago yielded 6.5 cords of pulpwood. Depletion of the growing stock during logging, absence of proper gradations of diameter classes, absence of adequate reproduction, and influence of hardwoods make it improbable that such a yield will be repeated naturally. Eight years ago 2.5 cords of balsam fir pulpwood were cut and 24 years after that cutting it is estimated that 3.5 cords will be available. Proper handling will allow young spruce and balsam trees to develop a good commercial stand.—*H. N. Lee.*

1021. KINDLE, E. M. *Notes on the forests of southeastern Labrador.* Geog. Rev. 12: 57-71. 1922.—There is sharp contrast between the desolate, treeless shore strip, due to year-round presence of ice in adjacent waters, and the heavily forested interior. The seaward edge of the forest consists of stunted and dwarfed black spruce (*Picea mariana*), but the timber increases in height inland to an average of 50-60 feet. Much of the timber is large enough for lumber production, but the bulk is more suitable for pulpwood. Exploitation has just begun. Data are given on individual large trees.—*S. B. Show.*

1022. MARTIN-ZEDE. *De l'influence de l'orientation sur les succès de la transplantation des arbres.* [The influence of orientation on the success of transplanting trees.] Compt. Rend. Acad. Sci. Paris 174: 61-63. 1922.—Work done on the island of Anticosti with species of fir, larch, spruce, and birch showed that trees do better if transplanted with their south side towards the south etc.; 50 per cent were found to be successful with this method as opposed to 6-8 per cent set without reference to orientation.—*C. H. Farr.*

1023. NELSON, MAURICE. *The utilization of jack pine in the manufacture of newsprint.* Paper Indust. 3: 1510-1513. 1922.—A complete description is given of actual use of *Pinus divaricata* in the manufacture of sulphite and groundwood pulp.—*H. N. Lee.*

1024. NOVAKOVSKY, STANISLAUS. *Climatic provinces of the Russian far east in relation to human activity.* Geog. Rev. 12: 100-115. 1922.—Forests of the region are described incidentally to a study of climate.—*S. B. Show.*

1025. SUTERMEISTER, E. The use of rotten and stained wood for making sulphite pulp. *Pulp and Paper Mag.* 20: 513-514. 1922.—Experiments showed that partially rotted spruce wood which is still moderately firm will yield 767 pounds of pulp per 100 cubic feet of actual wood, while sound spruce wood yields 956 pounds. The fiber from the rotted wood was weak and of very poor color. The outer part of spruce logs, especially if river driven, are discolored to a grayish brown; there is no decrease in yield of fiber due to this, but the pulp from the discolored wood requires much more bleach to produce a good white pulp.—*H. N. Lee.*

1026. WEST, C. J. Paper making trials at the Imperial Institute. *Paper* 28¹¹: 28-31; 28¹²: 25-27, 29. 1921.—Work done since about 1912 at the Imperial Institute, South Kensington, is reviewed.—*H. N. Lee.*

1027. WILLIAMS, C. O. The composition of Natal wattle bark. III. Union South Africa Dept. Agric. Bull. 1920¹: 14 p. 1920.—Mature wattle bark loses about $\frac{1}{2}$ its weight during drying. The total amount of bark and of tanning material increases with the age of trees, but the percentage of tanning matter is approximately the same. Coast trees mature more rapidly but are inferior to those grown in the Midlands. In the commercial samples of solid wattle extracts manufactured in Natal, the proportion of tanning matter varies from 59 to 67 per cent.—*E. M. Doidge.*

GENETICS

ORLAND E. WHITE, *Editor*

See also in this issue Entries 950, 1118, 1119, 1123, 1124, 1141, 1178, 1181, 1204, 1286, 1302, 1412, 1434, 1447, 1474, 1475, 1483, 1484, 1497)

1028. ANONYMOUS. Breeding wheat to resist rust. *Northwest. Miller* 126: 296. 1921.—The writer reviews addresses by W. P. THOMPSON and W. P. FRASER at Saskatoon, April, 1922. Thompson has tested, in field and greenhouse, hundreds of varieties from all parts of the world. Less than a dozen showed true resistance and none of these was a common wheat of spring type. Crossing experiments showed that resistance is inherited like other agronomic characters. A number of hybrids appeared resistant until 1919, when attacked by forms of stem rust not previously encountered at Saskatoon. Further breeding work, to secure resistance also to these forms of rust is being carried on.—Fraser is investigating methods of over-wintering of stem rust to determine the origin of spring infection. He has no direct evidence that the spring infection arises from the barberry. Eight forms of stem rust have been isolated in Canada and there is evidence of several others. In connection with the rust investigations, rows of varieties of common spring wheat, durums, and emmers, which are known to have some resistance, were seeded at various stations throughout western Canada.—*J. B. Harrington.*

1029. ANONYMOUS. The genetics of vegetables. *Gard. Chron.* 71: 146. 1922.—The Royal Academy of Belgium offers a triennial prize of 2,500 francs, to be known as the Prix Joseph Schepkens, for the best experimental work on the genetics of vegetables.—*L. R. Detjen.*

1030. ANONYMOUS. The value of selection and breeding. *Agric. Gaz. New South Wales* 33: 732. 1 chart. 1922.—Results from Hawkesbury Agricultural College egg-laying contests for 20 years are shown graphically for (a) 10 leading pens (60 birds), (b) 10 lowest pens (60 birds), and (c) for the whole competition. Gradual increase in eggs laid is noted.—*L. R. Waldron.*

1031. AAMODT, OLAF S. Correlated inheritance in wheat of the winter-spring habit of growth and rust resistance. *Phytopathology* 12: 32-33. 1922.—Kanred, a winter wheat, is resistant to several biologic forms of stem rust to which Marquis, a spring wheat, is sus-

ceptible. Seed of an F_2 Marquis-Kanred cross was sown in the spring at St. Paul, Minnesota, and the resulting plants placed in 9 groups, according to time of heading. Seven of these 9 groups set seed and were tested in F_3 . All individuals of the earliest-heading F_2 group bred true for spring habit. In the other 6 groups the percentage of spring plants in F_3 was in direct relation to the time of heading of the F_2 group. The segregation for rust, on F_3 seedlings with a single known biologic form, approximated a ratio of 3 resistant to 1 susceptible. This ratio was about the same for all heading periods.—J. A. Clark.

1032. AAMODT, OLAF S. The inheritance of resistance to several biologic forms of *Puccinia graminis tritici* in a cross between Kanred and Marquis wheats. *Phytopathology* 12:32. 1922.—Kanred, a winter wheat, was found immune, and Marquis, a spring wheat, susceptible. In a cross between these varieties, greenhouse studies of F_3 seedlings proved the plants to be either immune or completely susceptible. There were no intermediates. Immunity was dominant. The results of inoculation experiments indicated that apparently a single factor determines the reaction to several biologic forms. Families homozygous for spring habit and rust resistance were obtained in the F_3 generation.—J. A. Clark.

1033. ARMSTRONG, S. F. The Mendelian inheritance of susceptibility and resistance to yellow rust (*Puccinia glumarum*, Erikss. et Henn.) in wheat. *Jour. Agric. Sci.* 12: 57-96. 1922.—Work of other investigators, indicating that susceptibility and resistance to *Puccinia glumarum* is a heritable character in wheat, is substantiated. Results indicate a single factor difference. In a cross of a susceptible wheat \times resistant wheat, the F_1 gave susceptibility of an intermediate nature.—Environmental conditions materially influence the degree of infection, but the relative difference in susceptibility and resistance remains approximately the same. Evidence is presented that genetic factors for other plant characters may modify the expression of the factor for susceptibility and resistance.—Selection from a variety containing both resistant and susceptible plants isolated 2 pure strains, one homozygous for resistance, the other homozygous for susceptibility. Both selections appeared to be morphologically identical, differing only in resistance to rust. Under rust conditions the resistant strain gave about 50 per cent higher yield than the susceptible strain.—H. E. Brewbaker.

1034. BAUR, ERWIN. Die wissenschaftlichen Grundlagen der Pflanzenzüchtung. Ein Lehrbuch für Landwirte, Gärtner und Forstleute. [The scientific principles of plant breeding. A text book for agriculturists, gardeners, and foresters.] 1st & 2nd ed., v + 120 p., 6 pl. 11 fig. Gebrüder Borntraeger: Berlin, 1921.—In this popular presentation of the fundamentals of genetics applied to agriculture, the topics of variation, reproduction, inbreeding, and natural selection are covered briefly. Variations are classified as modifications due to environment, combinations following hybridization, and mutations. Reproduction is classified as asexual, sexual, and parthenogenetic. The reducing effects of inbreeding are made clear by data from the snapdragon and illustrated by the comparative size of 3 generations of inbred kale plants. Natural selection is shown to adapt various strains of cultivated plants to different conditions. Cultivated plants are classified into 4 groups: vegetatively reproduced, naturally self-fertilized, and naturally cross-fertilized plants which can be artificially inbred and those which can not. The application of methods of improvement to these 4 groups is illustrated by systems of breeding representative plants in each group. [See also Bot. Absts. 11, Entry 2472.]—D. F. Jones.

1035. BECKER, J. Über Vererbungsgesetze bei Gurken. [On laws of inheritance in cucurbits.] *Zeitschr. Pflanzenzücht.* 8: 290-293. 1922.—Attempts to produce xenia between squashes and melons through artificial cross pollination completely failed. Reports of xenia between these plants are probably due to the melon-like taste, odor, and color sometimes noted in very ripe squashes.—In a cross between a squash with short and yellow fruits and another with long and white fruits, the F_1 was found to have white fruits of intermediate length. The F_2 fruits were approximately 9 white and long; 3 yellow and long; 3 white and short; and 1 yellow and short. The F_1 and F_2 were raised in relatively poor soil, so that plants with the

fruit-size of the large parent (which normally grows in very rich soil) never reappeared.—*E. W. Sinnott.*

1036. BLARINGHEM, L. Note préliminaire sur l'hérédité de la prolifération et de la duplication chez *Cardamine pratensis*. [Preliminary note on the heredity of proliferation and double flowers in *C. pratensis*.] Bull. Soc. Path. Veg. France 9: 138-144. 1 fig. 1922.—The author crossed the common *Cardamine pratensis* L. with a double-flowering form, each strain having been derived from a single individual. The F_1 progeny were similar, with dominance of the single flower character. Eight F_1 plants gave only sterile fruits, while 101 gave fruits with seeds. Of the 101, 94 appeared normal; while 7 gave fruits all or in part proliferated, their inflorescences appearing as a mosaic made up in part of an inflorescence with fruits of the common *Cardamine* and in part of an inflorescence with proliferated ovaries. In the same ovary, the two characters may be juxtaposed. This is an example of Naudinian heredity.—*J. Dufrenoy.*

1037. BLOSSFELD, ROBERT. Die hauptsächlichsten Orchideen-Hybriden. [The principal orchid-hybrids.] Gartenwelt 25: 122-124, 155-157. 1921.—Examples of bigeneric crosses are *Adioda* = *Ada* × *Cochlioda*; *Anoetomaria* = *Anoetochilus* × *Haemaria*; *Brassocattleya* = *Brassovola* × *Cattleya*; *Epicattleya* = *Epidendrum* × *Cattleya*; *Oncidioda* = *Oncidium* × *Cochlioda*; *Schombocattleya* = *Schomburgkia* × *Cattleya*; *Zygobatemannia* = *Zygopetalum* × *Batemannia*. The following are trigeneric: *Brassocattlaelia* is a product from *Brassovola*, *Cattleya*, and *Laelia*; *Diacattlaelia*, from *Diacrum*, *Cattleya*, and *Laelia*; *Lowaria*, from *Brassovola*, *Sophronitis*, and *Laelia*; *Vuylstekeaeria*, from *Cochlioda*, *Miltonia*, and *Odontoglossum*.—Most *Brassocattleyas* which are products between *Brassovola Digbyana* and either *Cattleya aurea*, *C. Dowiana*, *C. Gaskelliana*, *C. labiata autumnalis*, *C. Mendeli*, *C. Mossiae*, *C. speciosissima*, or *C. trianae*, and the natural hybrid *C. Hardyana* are characterized by large flowers and very large and fringed labellum. *Brassovola Digbyana* usually produces 1 flower on each stalk, *Cattleya* of the *Labiata* group usually 3-4, and *Brassocattleyas* usually 2.—In crosses between *Brassovola Digbyana* and *Cattleyas* many characters of the former are dominant; in crosses between *B. Digbyana* and *Cattleya Dowiana* and its variety *aurea* many characters of the latter are dominant, especially the yellow color of the sepals and petals and the deep purple of the labellum. One cross between *C. Mossiae* and *C. gigas* does not flower, another flowers about July 1, and another about February. *C. Fredeekiae* (= *C. Mossiae* × *C. aurea*) flowers in the spring. The following results of crosses between white-flowering *Cattleyas* were obtained: *C. Mossiae alba* (*Wagnerii*) with *C. Gaskelliana alba* and *C. intermedia alba* produces only white flowering individuals. *C. Gaskelliana* × *C. intermedia alba*, *C. Schrosderae alba*, or *C. Harrisoniana alba* produces only lavender colored offspring. *C. Mossiae alba* (*Wagnerii*) × *C. gigas* Frau Melanie Beyrodt (with white sepals and petals and purple labellum) produces some albinos and some lavender flowers. *C. gigas* Frau Melanie Beyrodt × *C. aurea*, *C. Warneri alba* × *C. Gaskelliana alba*, and *C. gigas* Frau Melanie Beyrodt × *C. Gaskelliana alba* give the same results. The crosses *C. labiata alba* × *C. labiata alba* (*Cookson*) and *C. intermedia alba* × *C. Warneri alba* (*Peeters*) produce lavender colored flowers. *Laelia purpurata* and *L. tenebrosa* are generally used in crosses with *Cattleya*. Yellow flowered *Laeliocattleyas* are obtained by using as one parent *Laelia cinnabarina*, *L. flava*, *L. harpophylla*, or *L. xanthina*. *Saphronitis grandiflora*, with pure red flowers, has much influence on crosses with *Laeliocattleya*. *Epidendrum* has been crossed with *Saphronitis* (= *Epiphronitis*).—*J. C. Th. Uphof.*

1038. BRINK, R. A. The genetic basis for improvement in self-fertilized crops. Sci. Agric. 2: 83-87. 1921.—Essential features of the paper are (1), a review of the development of genetic thought as it has affected breeding practice with autogamous plants; (2) a discussion of a heretofore unemphasized property of pure lines.—Assuming that degressive mutations in pure lines occasionally occur, it is shown mathematically how the degressive strain gradually diminishes in proportion and thereby tends to be eliminated from the mixture with the original pure line.—*H. E. Brewbaker.*

1039. BUCHHOLZ, JOHN T. Developmental selection in vascular plants. Bot. Gaz. 73: 249-286. 28 fig. 1922.—Developmental selection consists of interovular (between ovules in same ovary) selection, embryonic (between embryos) selection, gametophytic (between male gametophytes such as pollen tubes and female gametophytes in same ovule) selection, and gametic (between gametes) selection. These are distinguished from natural selection. Selection between vegetatively branching parts is held to be intermediate, i.e., part developmental and part natural selection. Developmental selection as treated by the author has naught to do with such theoretical considerations as that of germinal selection. The data of conspicuous cases of polyembryony (sporophyte) and gametophytic selection are brought together. The author states that a good selective process has the following requirements: It should (1) start the competition simultaneously, (2) take place under uniform conditions, (3) measure comparable merit, and (4) rigidly eliminate the great majority that fall below the standard. The author holds that developmental selection much excels natural selection in meeting these requirements. Developmental selection may act upon very small quantitative characters, which situation may furnish a basis for selection of larger and more significant characters through linkage. Thus "the mechanism of developmental selection looks very promising as a means of accounting for many orthogenetic phenomena." Further, developmental selection may have a prominent rôle to play in the phenomena of variation and mutation. As regards the latter the discovery and recognition of them "depends upon whether they reappear in the next life cycle and thus pass the censorship of the developmental selection machinery."—*B. W. Wells.*

1040. COBB, FRIEDA. A case of Mendelian inheritance complicated by heterogametism and mutation in *Oenothera pratincola*. Genetics 6: 1-42. 1921.—A number of strains, all morphologically alike, of *O. pratincola* have been isolated. Strain E is genetically different from the other strains, of which strain C is a typical example. Strain E produces 4 types of revolute-leaved mutations not produced by other strains. Mut. *formosa* E is the most fertile and typical of the revolute-leaved series. Reciprocal crosses of mut. *formosa* E with f. *typica* E show matroclinic inheritance. Strain C \times mut. *formosa* E gives matroclinic progeny. Reciprocal cross mut. *formosa* E \times strain C gives F₁ of f. *typica* (flat-leaved) plants, and Mendelian segregation in F₂ of 3 f. *typica*: 1 mut. *formosa*.—Hypothesis of heterogametism offered in explanation of the phenomena assumes the occurrence of 2 types of gametes in *O. pratincola*, α gametes (usually female) and β gametes (usually male), the α gametes carrying some factors not represented in the β gametes. The zygote is formed by union of α gamete of pistillate parent and β gamete of staminate parent. The zygote in turn produces α (female) and β (male) gametes. In a cross the hybrid is unaffected by the nature of β of its pistillate parent, or α of its staminate parent. In addition to the characteristic α or β part, each gamete carries a group of factors common to both. At reduction, α and β behave as units; that is, there is no interchange of factors or chromosomes between characteristic α and β portions, each passing into the gametes (the α into the female, the β into the male) just as it entered the zygote from its parent. Chromosomes carrying factors common to both α and β portions of zygote show Mendelian segregation at the reduction division, each member of homologous pairs accompanying with equal frequency the α or β portions. Factors belonging to the α or β portions are inherited matroclinically or patroclinically, respectively; factors belonging to homologous and freely segregating chromosomes common to both α and β gametes are inherited in a Mendelian manner.—F. *typica* E produces mut. *formosa* by a change in a factor in the α portion of the α gamete (female) having no counterpart in the β portion of the β gamete (male). The mutated α gamete of mut. *formosa* is designated α^1 ; the β gametes of f. *typica* E and mut. *formosa* are equivalent. If mut. *formosa* is the pistillate parent in cross with f. *typica* E, the hybrid receives the α^1 gamete of mut. *formosa* and is similar to mut. *formosa*; in the reciprocal cross the progeny receive the α gamete of *O. pratincola* and the progeny are all f. *typica*. Strain C differs from strain E by having, in addition to the factor for flatness in the α portion of the α gamete, a freely segregating, dominant (Mendelian) factor (*F*) for flatness present in both the α and β gametes, of which the recessive allelomorph (*f*) is carried by strain E ($\alpha\beta ff$). Mutation of the α portion of f. *typica* C ($\alpha\beta FF$) to α^1 , if it occurs, would

be masked by the presence of Mendelian factor for flatness (F) in the remaining portion of the gamete. In strain E the change is visible since the Mendelian factor is present in the recessive form (f). Strain C ($\alpha\beta FF$) \times mut. *formosa* E ($\alpha^1\beta ff$) gives flat-leaved F_1 ($\alpha\beta Ff$) in which segregation of the Mendelian factors takes place in the F_2 but is masked by the presence of a factor for flatness in the α portion of the zygote. The genotypes and the ratio in which they occur are: $1\alpha\beta FF:2\alpha\beta Ff:1\alpha\beta ff$. The plants are all flat-leaved. In the reciprocal cross the F_1 zygote ($\alpha^1\beta Ff$) is flat-leaved due to the presence of the dominant Mendelian factor F received from the staminate parent, the factor for revoluteness carried by the α^1 portion of the zygote being masked. In the F_2 a ratio of 3 flat-leaved plants ($1\alpha^1\beta FF:2\alpha^1\beta Ff$): 1 revolute-leaved plant ($\alpha^1\beta ff$) was obtained. The new f. *typica* plants occurring in the F_2 of this cross ($\alpha^1\beta FF$ and $\alpha^1\beta Ff$) are designated f. *typica* M. In 1919, Cobb and Bartlett reported [see Bot. Absts. 3, Entry 2100] that the pollen of mut. *latifolia* C was equivalent to that of its parent, f. *typica* C. The same paper recorded results of crossing mut. *formosa* within strain E and demonstrated inheritance to be matroclinic. Mut. *formosa* E \times mut. *latifolia* C gave F_1 of 209 plants, all flat-leaved; in F_2 4759 flat-leaved to 1633 revolute leaved plants were obtained, i.e., a ratio of 2.9:1. The present paper reports that mut. *formosa* E \times f. *typica* C gave F_1 of 100 plants, all flat-leaved. F_2 contained 2399 flat-leaved and 875 revolute-leaved plants; i.e., a ratio of 2.74:1. Self-pollination of f. *typica* plants from F_2 of mut. *formosa* E \times mut. *latifolia* C gave in F_3 22 non-segregating to 41 segregating progenies, approaching closely the expected 2:1 ratio. In segregating F_3 progenies the ratio of flat- to revolute-leaved plants was 3.08:1. F_4 and F_5 have shown a continuance of the Mendelian behavior of this cross. Four recessive, revolute-leaved plants from F_2 of cross mut. *formosa* with mut. *latifolia* C gave in F_3 69 plants, all revolute-leaved. Reciprocal cross, f. *typica* C \times mut. *formosa* E ($\alpha\beta FF \times \alpha^1\beta ff$) gave all flat-leaved plants in the F_1 of 782 individuals. In the F_2 , 1654 plants were grown. Segregation of the Mendelian factors for flatness (F and f) had taken place in the F_2 but was masked by the ever present α factor for flatness inherited matroclinically. Revolute character can appear only by mutation from α to α^1 in plants of constitution $\alpha\beta ff$, or $\frac{1}{4}$ the progeny. Sixteen revolute plants in F_2 , or 16 per 1000, were found.—Nine crosses mut. *formosa* E \times f. *typica* E ($\alpha^1\beta ff \times \alpha\beta ff$) gave F_1 of 305 plants, all revolute-leaved. Four F_1 plants gave F_2 of 628 plants, all revolute-leaved. Reciprocal cross f. *typica* E \times mut. *formosa* E had been shown in previous paper to be matroclinic.—Data concerning F_1 and F_2 of 18 different kinds of crosses involving f. *typica* M as one parent, and f. *typica* C, f. *typica* E, or mut. *formosa* as the other parent, confirm the author's hypothesis of non-equivalent gametes and the presence of a pair of independent Mendelian factors in *O. pratincola*. The author points out that α of strain C may mutate to α^1 but in pure strain C the mutant type will find no expression until inhibiting Mendelian factors (FF) are removed by hybridization, as happens when strain C is crossed with mut. *formosa*. In this case hybridization apparently induces mutation when as a matter of fact hybridization has only made possible the appearance of changes that occurred in the past. It is not known whether strain E arose by change in dominant Mendelian factors FF to ff , or whether the reverse took place to form strain C. It is supposed that other strains of *O. pratincola* have factors FF as none of them throws revolute-leaved mutations. The reverse mutation can take place in that mut. *nitidissima*, a type originating in the experiment garden from strain E, is a homozygous dominant for the Mendelian factors for flatness. "This paper records the case of a single unit character of the zygote, revoluteness, determined by a complicated set of phenomena: an alleomorphic pair of factors (F and f) the dominance and recessiveness of which produce no effect on the zygote except when the particular mutational change from α to α^1 has taken place; a mutation (α to α^1) occurring repeatedly, but concealed, as long as self-pollination continues, by the Mendelian factors FF , and Mendelian segregation concealed by matroclinic inheritance dependent on heterogametism (α and β gametes). It is hoped that the case may throw light upon the seemingly peculiar behavior of the *Oenotheras*."—Wilber Brotherton, Jr.

1041. CENKIN, E. G. The mechanism of evolution. Sci. Monthly 10: 496-515. 1920.—It is certain that cytoplasmic differentiations of nerve, muscle, and gland cells have no direct influence upon hereditary constitution of germ cells and very doubtful whether cytoplasmic

differentiations of germ cells themselves affect their hereditary value. While differentiations of cytoplasm of egg do control some of the most important orientations of development, there is no satisfactory evidence that these differentiations are not the result of environment, or activity of chromosomes during early stages in the formation of the egg. If it could be proved that polarity, symmetry, or localization pattern of cytoplasmic substances of the egg are carried over from generation to generation, modifications of these differentiations would be of profound influence in evolution. But if these differentiations arise anew in each egg cell, as do various differentiations of tissue cells, through interaction of nucleus, cytoplasm, and environment, then evolutionary changes in orientation may find their ultimate causes in changes in nucleus rather than in cytoplasm. In the present stage of knowledge there is not sufficient evidence to conclude that modifications of cytoplasm of germ cells are ever really inherited or are ever initial steps in evolution. Almost all experimentally produced changes in chromosomes, known to persist, occur during mitoses, while those produced during intermitoses are, with few exceptions, relatively unimportant and temporary. Furthermore, most of the persistent modifications of chromosomes thus far discovered appear during maturation stages. These modifications consist in (a) changes in chromosome number, (b) changes in chromosome constitution. Although abnormality in chromosome number is found in some mutants, it is not certain that this abnormal number is the cause of mutation and there are some good evidences that it is probably a result rather than the cause. Under changes in constitution of chromosomes are listed crossing over, duplicated genes, and deficiency. The demonstration that the amount of crossing over may be affected by temperature and other influences furnishes direct evidence that genetical constitution may be changed by environmental influences acting on the germ cells at an early stage.—Under the heading "changes in genes" the issue of "new combinations, vs. new constitution," is discussed and the author takes issue with the "dogma of immutable genes." The fact that genes are relatively complex bodies would indicate that they can not be absolutely stable and wholly uninfluenced by environment. Mutation in genes may be thought of as due to the loss or addition of certain constituent atoms or molecules or to the rearrangement of some of these. Independent recurrence of a mutation must indicate a tendency for a gene to change in a particular way, just as chemical changes tend to go in certain directions—hence "orthogenesis." Although it is certain that mutations of genes take place, and although it is highly probable that these mutations, like all chemical and physical processes, are affected by environmental conditions, it is not known what the conditions are which induce mutations or how they may be initiated or controlled.—Mutation is characterized as a response of hereditary organization to certain stimuli. Just as the nature of any response is primarily determined by the nature of the organism, while stimuli serve merely to initiate, hasten, or retard response, so the nature of a mutation is probably definitely limited by the organization of the germplasm, while extrinsic causes serve only to initiate or retard it.—Bateson's hypothesis of evolution by loss is destructively criticized.—*F. B. Sumner.*

1042. CRANE, M. B. Experiments in breeding plums with a note on peaches. *Jour. Pomol.* 2: 137-159. 4 pl., 3 fig. 1921.—Five varieties of plums were selfed and all seedlings therefrom appear self-fertile. Hairiness of bark is dominant over glabrous bark, and crenate leaf margins over serrate leaf margins. Oblate and pyriform appear to be homozygous fruit forms oval being heterozygous. Yellow-green skin color is homozygous and red and purple heterozygous. Freestone varieties yielded freestones, and clingstone varieties gave a majority of clingstone seedlings. Of 150 self-pollinated seedlings from 1 freestone variety free from spines, 1 seedling was spiny clingstone, 1 spiny freestone, and 1 clingstone spineless.—Three varieties of peaches and nectarines were tested, all self-fertile. Small and large flowers are homozygous. Eglandular leaves and leaves with reniform glands are homozygous. Eglandular leaves are more susceptible to mildew. Six seedlings from a purple leaved variety had purple leaves.—*C. H. Connors.*

1043. CZUBER, E. Zu Paul Ehrenbergs Beweiss für die Anwendbarkeit der Wahrscheinlichkeitsrechnung auf Feldversuche. [Paul Ehrenberg's proof for the applicability of bio-

metrical method in field studies.] Landw. Versuchssta. 98: 223-241. 1921.—According to Czuber the formulae for the calculation of the standard deviation and probable error (S. D. = $\sqrt{\frac{\sum D^2}{n-1}}$, P. E. of a single determination = $.6745 \times \text{S. D.}$) can only correctly be applied when, the results give a frequency polygon which closely approaches the normal curve. The frequency distributions for various sets of data obtained from field studies are given. Many of the frequency distributions are distinctly asymmetrical and the calculated mean does not always coincide with the largest frequency class. For these reasons Czuber disagrees with the conclusion reached by Ehrenberg, that probable errors, obtained by the method outlined, can be legitimately applied to the data obtained from field experiments.—H. K. Hayes.

1044. DETLEFSEN, J. A. [Rev. of: WALTER, H. E. *Genetics, an introduction to the study of heredity*. Rev. ed., xvi + 354 p., 92 fig. Macmillan & Co.: New York, 1922.] Science 56: 145-146. 1922.—Great progress in genetics since previous issuance of this text has necessitated many changes. One of the new chapters on Architecture of the Germ Plasm gives most important advances made recently in genetics. The reviewer warns that conclusions as to distance between genes have outstripped evidence. A chapter on determination of sex introduces much new material. In this new edition the chapter on Pure Lines and Selection and the presentation of cytological facts follow Mendelism. Some criticism on mathematical aspects is made. New diagrams and the readable style of the book are praised by the reviewer.—J. P. Kelly.

1045. DUJARDIN, F. Pollination of tree fruits. Rev. Hort. 93: 300-302. 1921.—All varieties tested of sweet and sour cherries, except a few sweet, are self-sterile.—No cases of cross-sterility were found among apples. Some cases of cross-sterility were found among plums. Cross-sterility in cherries is questioned.—Varieties of *Prunus institia* probably are the best pollinators for varieties of *Prunus domestica*. *P. spinosa* failed.—C. H. Connors.

1046. EDLER. Pflanzenzüchtung und Sortenwahl. [Plant breeding and the selection of varieties.] Arbeit. Deutsch. Landw. Ges. 314. 25-42. 1921.—A brief general review is presented of work done in Germany on selection of field crops, and the machinery set up by the Deutsche Landwirtschaftliche Gesellschaft for testing out of varieties.—A. J. Pieters.

1047. GAUGER, MARTIN. Die Mendelschen Zahlenreihen bei Monohybriden im Lichte der Dispersionstheorie. [The Mendelian ratios in monohybrids in the light of the dispersion theory.] 54 p. Diss. Göttingen. 1919.—Published also in Zeitschr. Indukt. Abstamm. u. Vererb. 22: 145-198. 1920 [see Bot. Absts. 6, Entry 1675].

1048. GRIFFEE, FRED. First generation corn varietal crosses. Jour. Amer. Soc. Agron. 14: 18-27. 1922.—Previous investigations are summarized to show that, out of a total of 146 corn varietal crosses, 113 exceeded the parental average in yield of grain and 84 excelled the better yielding parent. Increase for all crosses was 11.7 per cent over average of parents. New results at Minnesota show that crossing gives greater increases when the parental varieties are closely selected for ear type than when selected on the basis of yield alone. A combination of flint maize (Squaw Flint) and dent (Minnesota No. 13) was found to be desirable in yield and early maturity.—D. F. Jones.

1049. HAGEDOORN, C., EN A. L. [HAGEDOORN]. Cucurbita-Strijdvragen. [Disputed questions in Cucurbita.] Genetica 4: 64-69. 1922.—The authors believe that they have succeeded in producing parthenogenetic seed in hybrid plants of *Cucurbita* because (1) closed buds on non-hybrid plants produced no seed; (2) closed buds on hybrid plants produced either fruits full of good seed or no seed at all, but never a few good seed only; (3) the segregation in progenies raised from such seed in hybrid plants are always what might be expected to result from the cross which was made. [See also Bot. Absts. 12, Entry 1055].—E. W. Sinnott.

1050. HYDE, ROSCOE R. An eyeless mutant in *Drosophila hydei*. *Genetics* 7: 319-334. 1922.—A recessive eyeless mutant gave discordant results from crosses and inbred cultures until it was learned that warm and dry conditions of the culture were necessary for its full expression. Warm moist cultures produced few eyeless, while cool dry cultures produced some mutants. Pure cultures of eyeless appeared when cultures were kept warm and dry. The influence of temperature and moisture is exerted after the eggs are laid. Back-crosses of hybrids to a double recessive eyeless-scarlet race showed linkage between these 2 mutant genes and no crossing over in the male.—J. L. Collins.

1051. JORDAN, DAVID STARR. The California poppy. *Science* 56: 168-169. 1922.—The author calls attention to a marked variation of *Eschscholzia californica* and its suitability for genetical work.—J. P. Kelly.

1052. KOTTUR, G. L., and R. K. KULKARNI. Cross-fertilization in Jowar (*Andropogon sorghum*). *Agric. Jour. India* 17: 413-416. *Pl.* 25. 1922.—The article records briefly the results of the authors' observations on the frequency of natural cross-fertilization in a field of sorghum surrounded by several rows of another variety. The variety in the field was a compact-panicked form in which the percentage of cross-fertilization is usually low as compared with that in the loose-panicked varieties. From 32 selected heads 7,616 plants were grown and of these 303, or approximately 4 per cent, were found to be hybrids. It could not be definitely said that all the intermediate forms classed as hybrids arose from cross-pollination in that season because the variety in the field was not a pure line. Only 2 out of the 32 heads selected were entirely free from cross-pollinated grains.—H. N. Vinall.

1053. KREMERS, R. E. The volatile oil of *Mentha aquatica* Linne, and a note on the occurrence of pulegone. *Jour. Biol. Chem.* 52: 439-443. 1922.—*Mentha aquatica* is now regarded as one of the parents of peppermint (*Mentha piperita*), and the elaboration of its oil can be thought of as following the same course as that of the other parent (spearmint, *Mentha spicata*) but stopping with the esterification of linalool.—G. B. Rigg.

1054. KRISTOFFERSON, KARL B. Studies on Mendelian factors in *Aquilegia vulgaris*. *Hereditas* 3: 178-190. 1922.—One plant of *Aquilegia vulgaris* bearing self-colored, dark blue flowers yielded a family of 40 offspring of which 22 were dark blue, 9 reddish violet, 7 light blue and 2 white. This ratio and results from subsequent generation led to the following digenic hypothesis: factor *B* conditions light-blueness; factor *R*, reddish color; *B* and *R*, present together, give deep blue; both absent leads to white. Other experiments revealed a simple recessive factor causing white margins of colored corollas. The factor *R* is thought to be "pleiotropic," i.e., to have effects on a plant other than that of producing reddish flower color; but the author admits the possibility of linkage explaining this situation.—J. P. Kelly.

1055. LOTSY, J. P. Cucurbita-Strijdvragen. [Disputed questions in Cucurbita.] *Genetica* 4: 70. 1922.—In this answer to Hagedoorn [see Bot. Absts. 12 Entry 1049] the author refuses to accept the existence of parthenogenesis in *Cucurbita* until it has been shown that the plants in question are haploid in chromosome number.—E. W. Sinnott.

1056. LOTSY, J. P. Eenige resultaten van het *Oenothera*-jaar 1920. [Some results of the *Oenothera* year 1920.] *Genetica* 2: 481-528. 57 fig. 1920.—I. The common origin of the *linearis* forms. The author states that *O. linearis* appeared in cultures from (1) a selfed *O. biennivelutina*; (2) a cross between *O. murivelutina* and *O. biennivelutina*; and (3) a selfed *O. fallax*, which was obtained from the reciprocal cross (*O. biennis* × *O. Lamarckiana*) of the one from which the aforementioned *O. biennivelutina* forms (*O. Lamarckiana* × *O. biennis*) came. The plants of *O. Lamarckiana* used in these crosses were from the same parent, and those of *O. biennis* were collected on the same spot. From a cross between another *O. biennis* plant collected at the same place and *O. muricata* the author obtained a *linearis* form, which he called *O.*

linearis stellaris (regular star-shaped rosette). He believes the following to be the only possible conclusion: "*O. biennis* from the railroad at Almen had hidden within all factors which were necessary to influence the formation of *linearis* forms." This does not mean according to the author that these *linearis* forms are identical, but that they have in common, one or more factors which cause the narrow leaves.—II. The common origin of the *epilobioides* forms. A case similar to that in I was observed in *O. epilobioides*, a form which appeared 3 times: (1) in 1918 in a cross between *O. murivelutina* and *O. muricata*; (2) in 1919 in a cross between *O. murilaeta gigas* and *O. murivelutina*; (3) in 1920 in a culture of a selfed variegated branch of a sectorial-variegated *O. biennivelutina*. These 3 forms are not alike in every respect, only in general habit and growth. The author believes that the *epilobioides* character is due to *O. murivelutina*, which appears in the ancestry of all 3 forms.—III. The common origin of the variegated forms. These forms were: (1) *O. biennilaeta*, sectorial variegated; (2) *O. biennivelutina*, sectorial variegated; (3) *O. biennilaeta*, aureo-variegated, and several variegated forms in other cultures. In every case *O. biennis* gathered at Almen was among the ancestors of the variegated forms. The author says "that neither the *linearis* forms, nor the variegated forms were mutants from the cultures in which they appeared," but that the factors influencing their specific character were already present in the *O. biennis* group from Almen.—IV. The common origin of the new *sulfurea* form. These forms were *O. biennivelutina sulfurea* and *O. fallax sulfurea*, and, as the author shows, due to an *O. biennis* ancestral influence similar to that in the forms mentioned in I and III. This association of factors influencing variegation and factors influencing yellow-flower color brings the author to suppose the possibility of the existence of Mendelizing factors, among which "white" and "sulphurea" should be extreme recessive factors for "green" and "yellow."—V. Different grades of green. The following results were obtained: The F_1 of the cross *O. Lamarckiana* \times *O. muricata* consisted of 60 *O. gracilis*, 64 *O. gracilis diluta*, and 72 white individuals; among a similar F_1 were 80 *O. gracilis diluta* and 85 white individuals. Among the F_1 of the cross *O. murivelutina* \times *O. biennilaeta* were some intermediate large-flowered forms, *O. mulamarckiana*, and this crossed with *O. muricata* gave rise to 71 *O. gracilis*, 95 *O. gracilis diluta*, 57 *O. coerulea*, and 86 *O. coerulea diluta* individuals, among all of which great differences in chlorophyll content were noticed. This condition resulted in the loss of new forms lacking chlorophyll, e.g., *O. rubrosepala* (new form from a selfed *O. biennivelutina* culture) kept alive during the winter in a greenhouse.—VI. Intermediate forms. The author discusses *O. submulamarckiana*, a cross between *O. mulamarckiana* and *O. murivelutina*. Other intermediate forms are: (1) a *laeta-fallax* form from a selfed *O. fallax*, a cross between *O. Lamarckiana* and *O. fallax*; *O. fallax sulfurea*, from a selfed *O. subfalloides*; and *O. biennilaeta cauli-punctata*, like *O. biennilaeta* but with the red stem dots of *O. biennivelutina*.—VII. Multiformity of descendancy was observed in several cases. A. *O. laevifolia* (from cross *O. fallax* \times *O. Lamarckiana*) gave, when selfed, 3 *O. nanella*, 1 *O. falloides*, 31 *O. Lamarckiana*, 3 *O. laevifolia*, and 1 questionable *O. Lamarckiana*. B. Division according to flower size among *O. murivelutina* and *O. murilaeta*. In 1918, the author noticed 3 flower sizes, large, medium, and small. He selected plants, and progenies came true to form. Among the individuals of a selfed *O. murilaeta* with round buds were 9 round buds (petals broader than long) to 3 pointed buds (petals longer than broad), showing pointed buds to be recessive. C. Formation of *O. Heriberti*, formerly *O. murilaeta-coerulea*. The author claims that "*O. muricata* forms others besides 'rigens' and 'curvans' egg cells, the chromosome complex of which consists of a mixture of 'rigens' and one or more 'curvans' chromosomes. The combination of such a mixed *muricata* egg cell with a 'gaudens' gamete forms *O. Heriberti*, which by selfing in our culture gave 28 *murilaetas* (16 round buds and 11 pointed buds, 1 died) and reproduced itself only once." Other examples of multiplicity of hybrids reported by the author are: (1) The F_1 of *O. biennilaeta gigas* \times *O. biennivelutina* gave 8 different types of plants, namely, *O. Lamarckiana proxima*, one which did not come into flower, *O. bullata*, *O. albiva*, *O. chloriva*, *O. flavosepala*, *O. semilata*, and *O. violaceo-sepala*. (2) The F_1 of *O. murilaeta gigas* \times *O. murivelutina* gave 3 types of plants, namely, *O. plicata*, *O. parvifolia*, and *O. laciniata*. The theoretical discussion of all these data will be given in a following paper.—Peter J. Klaphaak.

1057. LOTSY, J. P. *Oenothera*-proeven in 1919. [*Oenothera* experiments in 1919.] *Genetica* 2: 385-399. 1 pl., 3 fig. 1920.—To investigate the question whether it is possible to find among *Oenotheras* any influence of the protoplasm on the morphological characteristics of the different forms, the author used *O. Lamarckiana* forms obtained by crossing. One group of cultures came from a self-pollinated individual of an *O. Lamarckiana* culture, originated by crossing *O. biennilaeta* (from a cross of *O. biennis* \times *O. Lamarckiana*) with *O. murivelutina* (from a cross of *O. muricata* \times *O. Lamarckiana*). This group of cultures had, according to the author, a "gaudens-velans" combination in "albicansplasma." The latter was derived from the maternal ancestor *O. biennis*. Another group of cultures came from a self pollinated individual of an *O. Lamarckiana* culture obtained by crossing *O. murilaeta* (from a cross of *O. muricata* \times *O. Lamarckiana*) with *O. fallax* (from a cross of *O. Lamarckiana* \times *O. biennis*). The *O. murilaeta* used in this cross came from the same culture as *O. murivelutina* in the former cross. The *O. Lamarckiana* obtained had, then, a "gaudens-velans" combination in "rigensplasma," this being derived from the maternal ancestor *O. muricata*.—While the flowers of the 1st group are large, those of the 2nd are small. Both were typical *Lamarckianas*, which could not be differentiated until in flower. Cultures from self-pollinated individuals of the above-named groups were exactly like their parent.—A comparison of other groups of *O. Lamarckiana* with either "albicans" or "rigens" plasma showed that *Lamarckianas* with "rigens" plasma are small-flowered and never have large flowers, while those with "albicans" plasma are large-flowered. Among the latter are, however, a few heterogeneous forms which have some small-flowered plants, for instance No. 142 *O. Lamarckiana* coming from *O. biennilaeta* (*pseudo-gigas*) \times *biennivelutina*. It has 25 small-flowered to 17 large-flowered plants. The author concludes for the present that "the rigensplasma depresses the flower size of the velans-gaudens combination." He does not claim that this change in flower size is hereditary and plans to discuss, as soon as the results for 1920 are tabulated, whether or not a change in the velans-gaudens complex may possibly have taken place and, if so, its importance on his provisional conclusion in regard to the influence of protoplasm.—*Peter J. Klappaak*.

1058. MAINWARING, C. Improvement of Rhodesian white maize by selection. *Rhodesia Agric. Jour.* 19: 291-294. 1 fig. 1922.—Only white maize is grown in Rhodesia as it is neither profitable nor desirable to export mixed grades; but, though practically the only 2 acknowledged varieties grown are Hickory King and Salisbury White, the plants are far from uniform in vigor, etc. In order to produce uniformity, careful selection is necessary. The methods of selection are ear-to-row test, mass selection, and field selection. In the selection of ears for seed careful attention should be given to the following points: trueness to type, uniformity of appearance, size, shape of the ears and character of the indentation of the grain; the ears should be heavy when dry. A description is given of Salisbury White maize and Hickory King.—*L. J. Goldblatt*.

1059. MENDIOLA, N. B. A study of the inheritance of beardedness in rice in natural hybrids. *Philippine Agric. Rev.* 15: 28-43. 1 pl. 1922.—A study of 3 generations shows that beardedness in the 2 varieties studied is partly dominant over beardlessness. Line selection only can be recommended as the best method of purification.—*E. D. Merrill*.

1060. MEUNISSIER, A. Observations sur l'hérédité du caractère "pois à trois cosses" et du caractère "pois chenille." [Observations on the inheritance of the character "3-podded peas" and the character "chenille."] *Genetica* 4: 279-320. 1922.—Peas having 3 flowers per peduncle were crossed with a variety having the normal number (2). The 3-podded character is a recessive of great variability. The adherence of the peas to each other in the pod is called "chenille" (caterpillar), a highly variable, recessive character which is always associated with emerald foliage. In general, pink-flowered plants are less strongly "chenille" than white- or purple-flowered plants. From the results obtained it is impossible clearly to distinguish the modifying effects of environment from the effects produced by the action of genetic factors.—*Hugh C. McPhee*.

1061. PAINTER, THEOPHILUS S. **The sex chromosomes of the monkey.** *Science* 56: 286-287. 1922.—Cytological studies show that there are 27 pairs of chromosomes in the "ring-tail" monkey. The sex complex consists of relatively large X- and minute Y-chromosomes. X- and Y-chromosomes separate in the 1st maturation division and divide equationally in the 2nd. Figures are presented of the sex-chromosome complex in dividing spermatogonia, behavior of X- and Y-chromosomes in 1st spermatocyte division, and XY complexes in opossum, monkey, and man.—*R. E. Clausen.*

1062. PRIDHAM, J. T. "Flour strength" and "protein content." *Agric. Gaz. New South Wales* 33: 630. 1922.—High protein content is not necessarily associated with excellency of gluten in flour. If a movement toward entire wheat bread should assume importance, strength of flour, as well as yield of grain, must receive serious consideration by the plant breeder. *L. R. Waldron.*

1063. SCHAFFNER, J. H. **The sexual nature of vegetative or dichotomous twins of *Arisaema*.** *Ohio Jour. Sci.* 22: 149-154. 1922.—Dichotomous twins of *Arisaema triphyllum* (L.) Torr. and *A. Dracontium* (L.) Schott. showed fluctuations in some cases but were remarkably alike in varietal characters and were always of the same sex. Though no experiment whereby twins were induced to develop different sexual states was made, the fact that the sexual state of *Arisaema* has been changed by proper treatment is considered evidence that identity of sex in duplicate twins cannot be regarded as conclusive proof that sex is determined by Mendelian factors.—*H. D. Hooker, Jr.*

1064. SOUTHWORTH, W. **Alfalfa hybridization.** *Sci. Agric.* 2: 257-264. 1922.—The various parts of the alfalfa flower are described and illustrated. A careful study of the tripping of the flowers indicates that the spring-like-force which causes tripping is exerted by the staminal column rather than the pistil. Two ways of emasculating the flowers and various means of protecting the flowers after the pollen has been applied to the stigma are described. A greater percentage of fertile crosses were obtained during moderately warm dry weather. Treatment for a short time with sulphuric acid hastened germination when the hybrid seed contained considerable hard seed.—*H. L. Westover.*

1065. SUMNER, F. B. **Linkage in *Peromyscus*.** *Amer. Nat.* 56: 412-417. 1922.—The linkage relations between the genes for red-eyed yellow, pink-eyed yellow, and albinism in rats and pink eye and albinism in the mouse are stated, together with some data on linkage between the genes in *Peromyscus* for albinism and a pale red-eyed mutant, "pallid." Tests were made with F₂ extracted albinos and pallids mated with albino and pallid mice of known genotype. Among 135 young from 18 mice only 2 albinos and no pallids appeared, in the absence of linkage 37 albinos and 18 pallids should have been expected. The gene for pallid in *Peromyscus* and the gene for red-eyed yellow in Castle's rats are considered homologous. Albinos mated to a race of yellows gave no evidence of linkage.—*J. L. Collins.*

1066. VENKATRAMAN, T. S. **Germination and preservation of sugar-cane pollen.** *Agric. Jour. India* 17: 127-132. 1 pl. 1922.—The author points out that the iodine test for pollen viability simply reveals grains that were once viable. Germination tests are needed to determine viability at the time of pollination. The author was successful in using live stigmas of *Datura fastuosa* for germinating cane pollen. In sugar-cane, pollen begins to lose its viability in 20 minutes in the open air. Pollination must be effected promptly after pollen collection. A method is described by which pollen is kept alive for 11 days.—*J. P. Kelly.*

1067. WEINSTEIN, ALEXANDER. **Crossing over, non-disjunction, and mutation in *Drosophila virilis*.** *Sigma Xi Quart.* 10: 45-53. 1922.—This preliminary report shows the parallelism between *D. melanogaster* and *D. virilis* for crossing over, coincidence, non-disjunction, and the appearance of the same type of gynandromorphs and mutations. The rate of secondary non-disjunction was found to be lower than in other species. The YO male is sterile as in

D. melanogaster, the XXY females somatically indistinguishable from XX females. Triple cross-over is more frequent in the longer *D. virilis* X chromosome than in *D. melanogaster*. Two quadruple crossovers are reported for the X chromosome. Five mutant characters are mentioned, some of which resemble mutations in *D. melanogaster*. Several mutations appearing in *D. melanogaster* are briefly described.—*J. L. Collins*.

1068. WITSCHI, EMIL. Vererbung und Zytologie des Geschlechts nach Untersuchungen an Fröschen. [Inheritance and cytology of sex according to investigations on frogs.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 31-68. 1 pl., 8 fig. 1922.—From temperature experiments and the F₁ generation of crosses made between "differentiated" races (i.e., races whose tadpole gonads differentiate directly into pure males and females) and "undifferentiated" races (i.e., races whose male tadpole gonads are believed by the author to develop as transformations of female gonads) the following conclusions are drawn. (1) That the male of the differentiated race is heterozygous, with the formula *FFMm*; (2) that both male and female of the undifferentiated race are homozygous for sex, with the formula *FFMM*; (3) that the factors *F* and *M* in the undifferentiated race are equipotent, the sex being finally determined by thermal and resulting nutritive conditions; (4) the potencies of the factors *F* and *M* are different in each of the 4 differentiated races.—The author studied spermatogenesis of *Rana temporaria* and reports a diploid number of 26 chromosomes for this species as contrasted with reports by previous authors of 24 for other European species. He was unable to distinguish any X or Y chromosomes.—*C. L. Parmenter*.

HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issue Entries 1022, 1029, 1037, 1042, 1116, 1175, 1355, 1362, 1366, 1420, 1451, 1461, 1475, 1477, 1489, 1497)

FRUITS AND GENERAL HORTICULTURE

1069. ANONYMOUS. Coconut investigation. Agric. Bull. Federated Malay States 9: 175. 1922.—There appears to be no definite relationship between the diameter or circumference of coconuts and their copra content, nor between the volume of the nut and the volume of the kernel. The percentage of oil present appears to reach a maximum when the embryo weighs from 80 to 100 gm.—*I. H. Burkill*.

1070. ANONYMOUS. Export of grapes. Results of experimental shipments. Jour. Dept. Agric. Union South Africa 5: 231-233. 1922.—This article gives a report of the Trade Commissioner and lists the prices obtained in London for 27 varieties of grapes grown at the Paarl Viticultural Experimental Station last season. It was the purpose of the test to determine suitability for market. The views of the Government Viticulturist are given for each variety.—*L. Goldblatt*.

1071. ALLEN, W. J., and W. LE GAY BRERETON. Packing house appointments. Agric. Gaz. New South Wales 33: 515-523. 6 fig. 1922.—Methods are designed for apple packing under Australian conditions.—*L. R. Waldron*.

1072. ARNOLD, W. S. The curing of the lemon. Agric. Gaz. New South Wales 33: 579-584. 1922.—The conditions and methods discussed apply particularly to the Kurrajong citrus district.—*L. R. Waldron*.

1073. BARTLETT, R. G. Ripening bananas in an air-tight chamber. Agric. Gaz. New South Wales 33: 482. 1922.—A temperature of from 75 to 80°F. ripens the fruit in from 6 to 48 hours.—*L. R. Waldron*.

1074. BLACK, O. F., and J. W. KELLY. Examination of the fruit of *Samuela carnerosana* Trelease. Amer. Jour. Pharm. 94: 477-479. 1922.—The fruit has a high percentage of soluble sugars (62.2 per cent of reducing sugars, calculated as dextrose, and 3.80 per cent of non-reducing sugars, calculated as sucrose) which might make it valuable for the manufacture of alcohol. The authors state that 1 ton of dried fruits would yield theoretically 500 pounds of alcohol. The fruits, though without taste, might, because of high pectic content, be used for jams and jellies with other fruits lacking in pectic material. Tests for alkaloids were negative. Ether removed from the dried seed about 20 per cent of a yellow oil with a small amount of lecithin. Chloroform removed a wax-like product which did not seem to possess promising properties for further investigation.—Anton Hogstad, Jr.

1075. CRAWFORD, D. C., and N. A. SHAW. Fertilizers for fruit trees in the Western Province. Jour. Dept. Agric. Union. South Africa 4: 514-520. 1922.—The 3 elements of plant food that promote healthy growth are nitrogen, phosphoric acid, and potash; lime and gypsum exert a beneficial effect on the physical and biological condition of the soil. The source and method of application of these fertilizers are described, and amounts are recommended for securing a paying crop.—L. Goldblatt.

1076. DAVIS, R. A. Export of citrus fruits. Union South Africa Dept. Agric. Bull. 1922³: 19 p., 8 fig. 1922.—This is a revised edition of the Bulletin, Local Series No. 55 of 1918. The proper method of picking and packing fruit for export is described, the types of fruit most suitable for this purpose discussed, and extracts are given from the fruit export act.—E. M. Doidge.

1077. HELMER, R. H. The practical use of fertilizers. Ann. Rept. British Columbia Fruit Growers Assoc. 32: 37-38. 1921.—Nitrogen is the chief element lacking in semi-arid orchard soils and, in most cases, can probably be best supplied by the growing of leguminous cover crops.—J. W. Eastham.

1078. HUNTER, W. T. Building up our orchard soils. Agric. Jour. [British Columbia] 7: 58-59. 2 fig. 1922.

1079. MILSUM, J. N. The African oil-palm in Sumatra. Agric. Bull. Federated Malay States 9: 90-104. 1921.—An account is given of the cultivation of *Elaeis guineensis*, its aided pollination, yield, and pests.—I. H. Burkill.

1080. PHILLIPS, E. P. A potential weed *Araujia sericifera* Brot. Jour. Dept. Agric. Union South Africa 5: 151-152. 1922.—An account is given of this creeper which is spread all over the Union and is a nuisance in some gardens.—L. Goldblatt.

1081. POLE EVANS, I. B. Report on cold storage conditions for export fruit at Capetown. Union South Africa Dept. Agric. Bull. 1920²: 9 p., 6 fig. 1920. The decay of fruit cannot be attributed to unsatisfactory conditions in the railway trucks or the Government cold stores at the docks. The cool chambers on the ship and those belonging to the Imperial Cold Storage Company were not in a satisfactory state with regard to contamination with mould spores.—E. M. Doidge.

1082. TERRY, H. P. Pruning of deciduous trees. Union South Africa Dept. 1921⁵: 34 p., 27 fig. 1921.

1083. THOMSON, MARY R. H., V. A. PUTTERILL, and GEORGE HOBSON. Investigations on export citrus fruit from South Africa during 1921. Union South Africa Dept. Agric. Bull. 1922¹: 69 p., 43 fig. 1922.—Care in handling is again emphasized. On the boat the fruit should be kept at a temperature of 43-50°F.; however, air circulation and ventilation are as important as temperature. The quality of wrappers used on South African fruit is poor; this is one of

the causes of the unattractive appearance of certain packs. Waxed wrappers have been used experimentally with marked success. Oranges from certain districts, *e.g.*, Clanwilliam, do not appear to have good export qualities.—*E. M. Doidge*.

1084. TURNER, A. G. Citrus fruit growing in Rhodesia. Rhodesia Agric. Jour. 19: 159-168. Pl. 1-2, fig. 1-3. 1922.—The citrus industry in Rhodesia is reviewed, and the following items are discussed: selection of site, varieties to plant, and planting operations. The most suitable varieties for export trade are: (1) Washington Navel, (2) Valencia Late, (3) Jaffa, (4) Joppa, (5) Mediterranean Sweet, and (6) Paper Rind St. Michael. The first 2 are prime favorites at present. The 2 methods of planting are the square system and the hexagonal system.—*L. J. Goldblatt*.

1085. TURNER, A. G. Citrus fruit growing in Rhodesia. Rhodesia Agric. Jour. 19: 301-312. Pl. 1-5, fig. 1-7. 1922.—The following phases of citrus culture are dealt with: irrigation, fertilization, pruning, and spraying. No citrus orchard should be laid out in Rhodesia without the presence of facilities for irrigation. The 2 best methods of irrigating are by furrows and by a modified form of checks.—*L. J. Goldblatt*.

1086. WARCOLLIER, ET LE MOAL. Disparition progressive de l'acide sulfureux libre dans un jus de pomme conservé. [The progressive disappearance of free sulphuric acid from the juice of preserved apples.] Compt. Rend. Acad. Sci. Paris 174: 634-637. 1922.

1087. WESTER, P. J. A list of the tropical fruits at the Lamao Experiment Station. Philippine Agric. Rev. 13: 358-362. 1921.—This is a list of nearly 200 species, arranged alphabetically under the Latin names with accepted local names. No data of any kind are given regarding any of the species.—*E. D. Merrill*.

1088. WESTER, P. J. Notes on grafting tropical fruits. Philippine Agric. Rev. 13: 363-365. Pl. 20-25. 1921.—Random notes are given regarding the success or failure of grafting experiments in a few species of *Gnetum*, *Terminalia*, *Genipa*, *Pangium*, *Spondias*, *Eugenia*, and *Garcinia*.—*E. D. Merrill*.

1089. WESTER, P. J. Seedless breadfruits in the Caroline Islands. Philippine Agric. Rev. 14: 201-204. 1921.—This is merely a list of the native names with some very brief data regarding the types of fruits taken from Christian's book published in 1899 entitled The Caroline Islands.—*E. D. Merrill*.

1090. WESTER, P. J. The avocado and its propagation. Philippine Agric. Rev. 14: 185-194. Pl. 9-11. 1921.—Methods of propagating this popular fruit are discussed in a general way.—*E. D. Merrill*.

1091. WESTER, P. J. The food plants of the Philippines. Philippine Agric. Rev. 14: 211-384. Pl. 2-35, map. 1921.—A popular description is given of native and introduced species wild and cultivated, that are of value or potential value as food plants. The species are arranged alphabetically under their local names, with the addition of corresponding scientific names.—*E. D. Merrill*.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1092. ANONYMOUS. Native plants at the National Botanic Gardens. No. 13. *Listrostachys arcuata*. No. 14. Silver trees. South African Gard. 12: 249. 1 fig. 1922.—A brief description is given of each of the plants mentioned.—*E. M. Doidge*.

1093. BENEDICT, R. C. The Boston fern show. Amer. Fern. Jour. 11: 97-105. 1921. [1922].—The author describes the fern show held in Horticultural Hall, Boston, Sept., 1921. A list of the 248 forms shown is given; out of the 150 fern genera known, 54 were represented.—*F. C. Anderson*.

1094. DAY, W. B. The botany of aloes. Jour. Amer. Pharm. Assoc. 11: 620-621. 1922.—The cultivation, production, and synonymy of the various species of aloes is briefly discussed.—*Anton Hogstad, Jr.*

1095. MATHEWS, J. W. The cultivation of Geraniaceae. Jour. Bot. Soc. South Africa 8: 8-9. 1922.—Their requirements under cultivation vary as largely as their form. The native species are readily raised from seed. The perennial *Monsonia* and shrubby *Pelargoniums* may be increased from root-cuttings.—*E. P. Phillips.*

1096. MATHEWS, J. W. The cultivation of heaths. Jour. Bot. Soc. South Africa 8: 21. 1922.—Given good seeds, heaths are readily raised and quickly reach the flowering stage, most sorts doing so in their 3rd year. A compost made up of equal parts of sand, leaf-mould, peat, and loam suits the hillside species, and one of equal parts of sand, leaf-mould, and peat will suit the moisture-loving ones.—*E. P. Phillips.*

1097. MESSEL, L. A garden flora. Trees and flowers grown in the gardens at Nymans. County Life: London, 1918.

1098. PALMER, R. M. Gladiolus culture. Agric. Jour. [British Columbia] 7: 181-182. 1922.—The article deals in a popular manner with the growing of this plant on southern Vancouver Island.—*J. W. Eastham.*

VEGETABLE CULTURE

1099. ANONYMOUS. Trinidad dasheen. (*Colocasia exulenta*) [esculenta]. Agric. Gaz. New South Wales 33: 548. 1922.—Trials of this plant at Wollongbar and Grafton have proved failures.—*L. R. Waldron.*

1100. BECKEL. Anbauversuche mit Spätwirsingkohl. [Cultural experiments with late Savoy cabbage.] Mitteil. Deutsch. Landw. Ges. 37: 509-512. 1922.—A report is made on tests carried out in 1917, 1918, 1919, 1920, and 1921 at 9 stations and with 4 varieties.—*A. J. Pieters.*

1101. KERLE, W. D. Sweetpotatoes. Experiments with varieties from the United States. Agric. Gaz. New South Wales 33: 495-496. 1922.—The imported varieties did well under adverse conditions, and their superior flavor and cooking qualities make them a valuable addition.—*L. R. Waldron.*

1102. KUHN, K. Von jüngsten Stand der Gemüse—und Beerenobstgärtnerel in Petersburg und Umgegend. [Condition of vegetable and berry raising in Petrograd and vicinity.] Gartenwelt 26: 351. 1922.—In Russia nurseries are in bad condition and can be built up only by foreign help. Vegetable growing has revived somewhat, but production is far less than before the revolution. The growing period is but 3 months, though the days are long. Only the early varieties of vegetables are grown, the following being standard. (1) Cabbage; Glückstädter, Ruhm von Enkhuizen, Braunschweiger, and a very early one originally from southern Russia, Nummer I; (2) turnips; Krasnoselskoje is the best; (3) cucumbers; Muromsche, Wjasnikowsche, and Borowsche.—Seed selection is very faulty as private trading is forbidden, and agents knowing nothing of vegetable seeds buy large quantities abroad.—Fruit trees do not thrive with the exception of the following varieties of apples, which do not always ripen; Antonowka, Weisser Klarapfel, and Lehm. No pears, plums, or cherries can be grown on account of the winter, but the following berries are produced; strawberries, Lexton Noble and Deutsche Evern; gooseberries, Avenarius; raspberries, Usanka. Berry growing was once profitable, but many large berry plantations are now either in bad condition or entirely ruined.—*J. C. Th. Uphof.*

1103. MARTIN-CLAUDE. *Les champignons sèches sur le marché de Paris.* [Dried mushrooms in the Paris market.] Bull. Trimest. Soc. Mycol. France 37: 148-149. 1921.—Drying is done in ovens heated by radiators. Tests showed that when placed in water specimens absorb water to the extent of 2.43 per cent of their dry weight. The flavor is not injured by drying. It is suggested that the handling necessitated by picking and drying may serve as a safeguard against the introduction of poisonous species into the market.—*D. S. Welch.*

1104. REICHELT. *Ergebnis eines dreijährigen Anbauversuches mit vier Zwiebelsorten.* [Report of a three-year culture test with four varieties of onions.] Mitteil. Deutsch. Landw. Ges. 37: 524-531. 1922.—Tests made at 7 stations in 1919, 1920, and 1921 are reported.—*A. J. Pieters.*

1105. WALTERS, J. A. T. *The sweet potato.* Rhodesian Agric. Jour. 19: 411-419. 2 pl. 1922.—The culture of the sweet potato (*Ipomaea Batatas*) is described. It is the most successfully grown stock feed in Rhodesia. Besides the edible root, it provides heavy yields of palatable and succulent fodder. Planting, which should be done before mid-December, may be on the flat or on the ridge, the latter rendering the harvesting easier though not providing as heavy yields as the former.—*L. J. Goldblatt.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 1003, 1005, 1036, 1064, 1209, 1277, 1282, 1286, 1298, 1318, 1396, 1409, 1441, 1448, 1475, 1491)

1106. ARBER, AGNES. *On the nature of the blade in certain monocotyledonous leaves.* Ann. Botany 36: 329-353. 29 fig. 1922.—As a further test of the phyllode theory of the monocotyledonous leaf, the development of the leaf in many members of that class was studied and compared with that of dicotyledonous plants. It was found in some cases that the course of development was indistinguishable from that found in dicotyledons, thus furnishing no support for the theory. On the other hand, in some whole families (e.g., Palmae) and in individual genera within many different families, the blade is produced by an invagination of the petiole or sheath, a process which appears to play no part in the development of dicotyledonous leaves. Cases of invagination are so numerous and so scattered as to confirm the author's view that the blades of monocotyledons are pseudo-laminae. A classification of the leaves of the whole group is outlined, based upon the course of development and chiefly upon the numerous forms which the invagination assumes.—*W. P. Thompson.*

1107. BAAS-BECKING, L. G. M. *The origin of the vascular structure in the genus Botrychium, with notes on the general anatomy.* Recueil Trav. Bot. Néerland. 18: 333-372. 2 pl., fig. 1-48. 1921.—*Botrychium obliquum*, *B. simplex*, *B. neglectum*, *B. virginianum*, *B. silacifolium*, and *B. lanuginosum* were studied. Cauline strands, such as occur in the Marattiaceae, are absent in the stems of *Botrychium*. In *B. obliquum* the suspensor has no influence on the position of the cotyledon. The development of the vascular bundle starts at a very early stage. The protoxylem is typically irregular and the protophloem conspicuous by its shrunken cells. The junction of root and leaf traces shows that the primary xylem of the leaf becomes the innermost part of the xylem, the protophloem of the root being situated at the periphery. The pericycle is in many species of *Botrychium* the place where the secondary xylem is formed, and it is assumed that this cambial activity is an initial stage in the secondary growth of the stele. The vascular system of the root is the same as is shown by Campbell for *B. virginianum*. In *B. silacifolium* the leaf trace has a typically Osmundaceous character. The development of *B. simplex* shows a close affinity to that of *B. lunaria* and *B. neglectum*. The relationship of *Botrychium* to *Ophioglossum* and *Helminthostachys* is apparent. In the roots and prothallia, the endophytic fungus is abundant in all species, but is

absent in the leaves except in *B. silacifolium*. The mycelium stains deeply with safranin and in older stages with Bismarck brown also. The fungus closely resembles *Stygoosporium Marattiacearum*.—*J. C. Th. Uphof*.

1108. **BLOMQUIST, HUGO L.** Vascular anatomy of *Angiopteris evecta*. Bot. Gaz. 73: 181-199. Pl. 1-4, fig. 1-7. 1922.—Young sporophytes from Samoa were studied. Cortical and central vascular primary regions are distinguished. In addition to the crescentic vascular strand of the central region, commissural and medullary strands appear. The leaf traces are always given off from the same edge of the central strand, and at corresponding positions below, on the other edge, a root departs. The contribution to the leaf traces is balanced on the opposing edge by an increase in the vascular tissue and by addition of commissural strands. The spiral condition is due to the spiral succession of leaves. The course of all tissue strands and their fusions is described in detail. The evidence found leads the author to suggest "that the vascular tissue of the central region is a sympodium of leaf traces and most if not all of the central strand is of foliar origin."—*B. W. Wells*.

1109. **BOS, H.** Waterloten. [Water-sprouts.] Cultura 34: 141-151. 11 fig. 1922.—An individual of *Picea excelsa* developed a lateral twig which grew vertically and had the same appearance as the main stem. This twig did not grow from a dormant, but from an adventitious, bud. Water-sprouts are also described in *Betula alba*, *Prunus cerasus*, *Robinia pseudacacia*, and *Fagus sylvatica*.—*J. C. Th. Uphof*.

1110. **BURKILL, I. H.** Notes on Dipterocarps. No. 7. On the fruit and germination of *Isoptera borneensis*. Jour. Straits Branch Roy. Asiatic Soc. 86: 281-284. 1922.—The fruits of this species are distributed by water, the corky sepals forming the buoyant part. The embryo does not cease growth at the time of the fall of the fruit, but by pressure from within bursts the fruit-wall, usually along 3 lines. The position of these lines is not constant and is a response to the direction of the pressure.—*I. H. Burkill*.

1111. **BURKILL, I. H.** Notes on Dipterocarps. No. 8. On some large-fruited species, and in particular upon the effects of the pressure of the embryo against the interior of the fruit-wall. Jour. Straits Branch Roy. Asiatic Soc. 86: 285-291. 1922.—*Shorea Thiseltoni* King has oily fruits too large for wind distribution and which sink in water. They are distributed over small distances by rolling along the forest floor or by means of animals. The embryo does not become dormant but continues growing, bursting the fruit-wall at the places where pressure is greatest. The drying wall contracts slightly, causing one or more of these openings to gape widely. In *Vatica Ridleyana* Brandis, which has a larger and starchy fruit, and in *Dryobalanops* sp., "Koladan," which has a wingless fruit, the fruit-wall is ruptured in much the same way as in *Shorea Thiseltoni*. These are not cases of true dehiscence.—*I. H. Burkill*.

1112. **BUSCALIONI, L., E G. ROCCELLA.** Intorne ad alcune singolari anomalie delle radici di una plantula di *Amygdalus communis* L. [Some peculiar anomalies in roots of an *Amygdalus communis* seedling.] Malpighia 29: 294-315. Pl. 1-3, fig. 1-17. 1922.—A case of polytomy is reported in which the main root of a seedling was split into 4 rather short secondary roots of unequal length, brownish, and diseased in appearance. Cross sections demonstrated various distortions and abnormalities of structure, particularly in the vascular system, which are described in detail.—*Edith K. Cash*.

1113. **CATALANO, G.** Anatomia fisiologica del tessuto verde fogliare delle Graminaceae. [Physiological anatomy of the green leaf tissue of the Graminaceae.] Gior. Sci. Nat. Econ. Palermo 32: 87-119. 1921.—The author reviews in detail the work of previous writers. He suggests the following tissue classification, based primarily upon anatomical characters. Group I: Leaf tissue consisting of ordinary green cells, either elongated or isodiametric, and producing both sugar and a small amount of starch by photosynthesis. Group II: Leaf tissue consisting of cells of varying form and producing only sugar (rarely traces of starch). Group

III: Tissues of the bundle sheath forming conspicuous amounts of starch and surrounded by paler cell layers which produce no starch. The individual groups are subdivided according to the number of cell layers, the differentiation into palisade and spongy parenchyma, the relative size of the bundles, and the presence of sclerenchymatous elements and other specialized tissues. In doubtful species, the internal characters aid in assigning these species to their proper groups.—*Ernst Artschwager.*

1114. CONARD, H. S., and W. A. THOMAS. Measurements of wood fiber. *Proc. Iowa Acad. Sci.* 26: 333-335. 1919.—The maximum, minimum, and average lengths and widths are given for fibers from 41 species of wood from the genera *Pinus*, *Picea*, *Tsuga*, *Abies*, *Sequoia*, *Taxodium*, *Thuja*, *Juniperus*, *Juglans*, *Carya*, *Populus*, *Salix*, *Betula*, *Fagus*, *Quercus*, *Ulmus*, *Celtis*, *Liriodendron*, *Platanus*, *Prunus*, *Robinia*, *Acer*, *Tilia*, *Fraxinus*, and *Catalpa*. The cells were obtained by maceration with nitric acid and potassium chlorate.—*H. S. Conard.*

1115. COSTERUS, J. C. La structure de la fleur de Canna. [The structure of the flower of Canna.] *Recueil Trav. Bot. Néerland.* 17: 26-32. 1 pl. 1920.—A general account is given of the structure of the flower in this genus, with especial reference to the connective tissue ("accoupleur") which joins the style to the stamens, the syndrome of the flower, and the morphological significance of the style.—*J. C. Th. Uphof.*

1116. KONDO, M. Ueber die in der Landwirtschaft Japans gebrauchten Samen. [The seeds used in Japanese agriculture.] *Ber. Ohara Inst. Landw. Forsch.* 2: 95-131. Fig. 34-38. 1921.—This continuation of descriptions already published [see *Bot. Absts.* 5, Entry 37; 8, Entry 2013] deals with certain morphological characters of seeds and seedlings. The present article concerns the following species: *Spinacia spinosa*, *S. glabra*, *Beta vulgaris*, *Capsicum annum*, and *Nicotiana Tabacum*.—*H. S. Reed.*

1117. LUYTEN, IDA, EN MARTHA C. VERSLUYS. De Periodiciteit van de Knopontwikkeling bij *Rhododendron*, *Azalea* en *Syringa*. [The periodicity of bud development in *Rhododendron*, *Azalea*, and *Syringa*.] *Mededeel. Landbouwhoogeschool Wageningen* 22: 1-128. 9 pl. 1921.—In *Rhododendron Catawbiense* Boursault the differentiation of the flower primordia in the axils of the lower bracts in most of the inflorescences was found to be fairly advanced by June 23. Every bud contained an average of 16 flowers. By August 19 the anthers had grown very tall and the ovary had reached a fuller growth. By October 22 the flower was in the condition in which it would remain through the winter. The bractlets had now become downy and strongly toothed. During the formation of the flower the axes elongate and their later extension forms the umbel-shaped raceme. Temperature was found to have an important influence on the development of flower buds. In *Azalea mollis* × *chinensis* Anthony Koster, the terminal flower buds only were studied. The growing point forms but 1 circle of stamens (instead of 2 as in *Rhododendron*), then passing on to the formation of carpels. The few buds scales around the flower buds are almost all deformed foliage leaves and often have small leaf buds in their axils. The lateral buds have true scales. The flower bud in 1918-1919 showed no increase in size from October till April. In *Syringa vulgaris* the first floral differentiation generally occurs in the shape of a rectangular calyx wall around the primordium. The sepals arise rather irregularly from the calyx wall and the 4 petals and the stamens inside these become visible soon after. The 2 carpels appeared as small elevations in the earliest flowers on August 1, 1919. On August 18 the division into anthers was clearer, whereas the carpels were but little more developed. On September 18 differentiation into anthers and locelli was clearly visible in most flowers. The development of the inflorescence and the formation of the leaf buds are also described.—*J. C. Th. Uphof.*

1118. MANN, H. H. Variation in the flower of *Jasminum malabaricum* Wright. *Jour. Linn. Soc. Bot. London* 45: 155-158. 1920.—The variability of the corolla and calyx lobes of the tropical climber, *Jasminum malabaricum*, was studied in the jungle where the plants were unquestionably wild. Tables are presented showing counts on many flowers, and comparing

the flowers on different inflorescences and on plants differing in vigor. The flowers on various inflorescences vary irregularly. The differences in different plants are marked. Different numbers of lobes or teeth seem to be constant for different plants, and "this condition seems to be a function of the individuality of the plant." A study of the correlation in number of corolla lobes and calyx teeth was also made and a table prepared. This correlation appears to be very slight.—A. J. Eames.

1119. OBATON, F. Sur le nanism des feuilles des arbres. [Concerning nanism of the leaves of trees.] Rev. Gén. Bot. 34: 264-279. 1922.—Leaves of *Castanea vulgaris*, *Ligustrum japonicum*, *Ulmus campestris*, *Tilia* spp., *Fagus silvatica*, *Carpinus betulus*, *Buxus sempervirens*, *Prunus avium*, *Acer platanoides*, and *Celtis australis* were studied and measurements recorded. The author concludes that all the adult leaves of the same species have the same thickness. The anatomical elements have analogous dimensions and are equal in number in transverse section. Vessels which supply the same number of cells are of the same size. The grouping of the vessels into bundles is made in such a manner that comparable veins serve identical foliar surfaces; but if the number of elements to be vascularized becomes greater, the number of vessels increases, and the quantity of fibro-vascular bundles is enlarged. Thus the petiole of a small leaf of the beech presents a single group of fibro-vascular bundles where in a comparable region of the petiole of a large leaf 2 or more groups of bundles occur. In chestnut it was necessary to choose leaves having exactly the same surface in order to find in their petioles comparable structures. All the modifications observed led to the conclusion that the small leaf was not a reduction of a large leaf. All the facts showed that nanism of leaves consists entirely in the reduction of the number of elements and not in the diminution of their size.—J. C. Gilman.

1120. RECORD, SAMUEL J. On Formosan forests. [Rev. of: KANEHIRA, RYOZŌ. Anatomical characters and identification of Formosan woods with critical remarks from the climatic point of view. 317 p. Bureau of Productive Indust. Taiboku, Formosa, 1921 (see Bot. Absts. 11, Entry 443).] Geog. Rev. 12: 152-153. 1922.

1121. RINGEL-SUESSENGUTH, MARGARETE. Über Ruheorgane bei einigen Wasserpflanzen und Lebermoosen. [On resting organs in certain aquatic plants and liverworts.] Flora 115: 27-58. 1 fig. 1922.—Three aquatic plants (*Hydrocharis morsus ranae*, *Myriophyllum verticillatum*, and *Utricularia vulgaris*) and 3 liverworts (*Fegatella corsica*, *F. supradecomposita*, and *Pellia calycina*) were investigated with respect to their resting organs and the conditions necessary for their development. It was shown that the formation of these organs was not due to an autonomous periodicity but that it could be hastened or postponed by appropriate means. The most potent factors in hastening the process were found to be reduced light intensity, low temperature, and diminished supply of water and nutrient salts; while maintenance of the conditions prevailing during the summer months delayed the process or, in the case of *Pellia*, prevented it altogether. It was shown further that the resumption of growth in the resting organs could be accelerated by various stimuli, such as mechanical injury, continuous illumination, treatment with potassium cyanide, or higher temperature. Other recommended methods of forcing, however, such as treatment with ether or the injection of water or diastase, proved unavailing.—A. W. Evans.

1122. RUTKIEWICZ, M. B. Recherches anatomiques sur l'*Asarum europaeum* L. [Anatomical studies on *Asarum europaeum*.] Ann. Univ. Grenoble 33: 21-146. Pl. 1-3. 1921.—The arrested development of the 2nd foliage leaf and the atypic structure of the 1st node of the rhizome in this species is a predisposition toward the production of the ancestral form. *Asarum variegatum* of Japan has only a single foliage leaf, and it is therefore suggested that the European species is a derived type, the 2nd foliage leaf being a newly acquired, but not as yet firmly fixed, character.—Ernst Artschwager.

1123. STOUT, A. B. Cyclic manifestations of sterility in *Brassica pekinensis* and *B. chinensis*. Bot. Gaz. 73: 110-132. Fig. 1-7. 1922.—Strains of the above species charac-

terized by excessive leafy growth were studied. Three types of sterility were noted: (1) Impotence as indicated in flower abortion and arrested development of the last flowers; (2) Proliferation as exhibited by destruction of pistils through the development of floral "anlage" within the carpels at their bases. The pistils of the resultant flowers do not produce fruit; (3) Grades of sexual incompatibility are present. From complete self-incompatibility (about half the plants studied) all grades of self-compatibility ("feeble," "medium," "strong") were noted. With respect to single plants it was found that the period of mid-bloom (the climax of reproductive activity) showed the maximum self-compatibility, the period before and after being characterized by flowers which made no response to self-pollination. Work with pedigree cultures indicated that self-compatibility is a character which is not hereditary. The author points out that through the sexual differentiation of sporophytic structures in the evolution of the higher plants, "sexual reproduction has become more and more inter-related with the vegetative phase of the sporophyte and subject to its internal and biogenetic regulation. * * * * The expression of sex therefore is on the same basis as are somatic differentiations. The various types of sterility seen in these species of *Brassica* indicate a mutually limiting relationship between vegetative and reproductive vigor."—*B. W. Wells.*

1124. TONI, J. B. DE. Contribution to the teratology of the genus *Datura* L. Jour. Linn. Soc. Bot. London 47: 419-420. Pl. 25. 1921.—The author describes a type of monstrosity new to the genus *Datura*, in which monstrosities and anomalies are common. In *D. Stramonium* certain plants which form normal flowers and fruits in the early season later develop flowers with, large inflated, foliaceous calyx, and with corolla, stamens, and ovary vestigial or wanting. The writer purposes studying the inheritance of this condition.—*A. J. Eames.*

1125. VERDOORN, INEZ C. Note on *Aponogeton distachyon*. South African Jour. Nat. Hist. 3: 17-19. 1 pl. 1922.—At maturity the carpels split at the apex and the pericarp curls back and exposes the seed, which escape and float on the surface of the water. After floating for 8 days the testa splits and the "seed" sinks and germinates in the soil under water.—*E. P. Phillips.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 1257, 1328, 1427)

1126. CROW, W. B. A critical study of certain unicellular Cyanophyceae from the point of view of their evolution. New Phytol. 21: 81-102. Fig. 1. 1922.—The characters of various genera of the Chroococcaceae are analyzed with a view to ascertaining their importance in the evolution of the group and in helping to establish a satisfactory system of classification. It is concluded that "certain characters, such as the orientation of the planes of division, the form of the cell, the size of the cell, can be, to a large extent, relied upon as systematic distinctions," while the presence of pigments, pseudovacuoles, and certain types of stratified membranes may also be of importance. "The degree of differentiation of the protoplasm and particularly the distribution of the pigment are very significant." "On the other hand, the character of the stratum or colony has only slight morphological significance." The Chroococcaceae as a whole form a homogeneous group which is primitive rather than reduced in its simple characters.—*I. F. Lewis.*

1127. HAZEN, TRACY E. New British and American species of *Lobomonas*: a study in morphogenesis of motile algae. Bull. Torrey Bot. Club 49: 123-140. Pl. 5-6. 1922.—*Lobomonas pentagonia* from England and *L. rostrata* from New Jersey are described as new species; a discussion is given of morphology and reproduction. "A consideration of morphogenesis in primitive algae" gives a review of recent literature and of problems involved.—*P. A. Munz.*

1128. HAZEN, TRACY E. The phylogeny of the genus *Brachiomonas*. Bull. Torrey Bot. Club 49: 75-92. Pl. 3-4, fig. 46-50. 1922.—For the first time *Brachiomonas*, a genus of the *Chlamydomonas* group, is reported outside of western Europe. *B. submarina* Bohlin from Long Island Sound is discussed as to habits and morphology, and forma *obtusata* f. nov. is described. *B. simplex* sp. nov. is described from Norway and England. *Chlamydomonas caudata* Wille is discussed, as is the phylogeny of certain *Chlamydomonads*.—P. A. Munz.

1129. RICH, FLORENCE. A new species of *Coelastrum*. New Phytol. 20: 234-238. Fig. 1-15. 1921.—*Coelastrum schizodermaticum* sp. nov. is described from Leicestershire. The diameter of the usually 8-celled coenobium is about 35 μ , of a single cell 10-14 μ . Cap-like structures are split off from the outer walls of the cells.—I. F. Lewis.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 1121, 1214, 1253)

1130. DOUIN, CH. Sur le gamétophyte des Marchantiées. [On the gametophyte of the Marchantiaceae.] Compt. Rend. Acad. Sci. Paris 174: 121-123. 1922.—Certain cells remain alive in otherwise dead thalli for 1, 2, or even more years. These cells are the terminal initials and the secondary initials. Various anomalies are mentioned. A description of the relation of primary and secondary initials and the merophytes in the course of the development of the thallus is given.—C. H. Farr.

1131. PEARSON, W. H. New Tasmanian hepatic (*Cheilolejeunea hobartiensis* Pearson). Rev. Bryologique 49: 11-13. 14 fig. 1922.—Under this name the author describes and figures a new hepatic from the vicinity of Hobart, Tasmania, basing it on material collected by W. A. Weymouth. He likewise discusses *Strepsilejeunea austrina* Spruce of New South Wales and refers it as a synonym to *Lejeunea mimosa* Tayl.—A. W. Evans.

1132. POTIER DE LA VARDE, R. Observations sur quelques espèces du genre *Fissidens*. [Observations on certain species of the genus *Fissidens*.] Rev. Bryologique 49: 1-5. 5 fig. 1922.—The present paper is the continuation of a series, the earlier parts of which have already been abstracted [see Bot. Absts. 5, Entry 628; 6, Entry 158; 7, Entry 1975; 8, Entry 1270; 10, Entry 1844; 12, Entry 585]. The author here reports *Fissidens Curnowii* Mitt. for the first time from Tunis, the record being based on specimens earlier listed as *F. crassipes* Wils. He also gives a full discussion of *F. crassipes* var. *Philiberti* Besch., a calcicolous plant known only from Algeria and Morocco. As a result of his studies he separates it from *F. crassipes* and describes it as a distinct species under the name *F. Philiberti* (Besch.) P. de la V.—A. W. Evans.

1133. POTTIER, M. Recherches sur le développement de la feuille des mousses. [Studies on the development of the leaf in mosses.] Ann. Sci. Nat. Bot. 3: 1-137. 32 pl. 1921.—This paper was originally issued as a separate publication and has already been abstracted [see Bot. Absts. 9, Entry 879].—A. W. Evans.

1134. THÉRIOT, I. Mousses de l'Annam, 2^e contribution. [Mosses of Annam, 2nd contribution.] Rev. Bryologique 49: 6-9. 3 fig. 1922.—The author's 1st paper on the mosses of Annam appeared in 1919 [see Bot. Absts. 4, Entry 1041]. The present paper is based on a collection made in August, 1919, by F. Vincens on Mt. Honbâ, at an altitude of 1500 m. Of the 14 species enumerated, *Homaliodendron elegantulum* and *Sematophyllum Vincensianum* are described as new and the following 3 species are recorded for the 1st time from the Asiatic continent: *Otenidium serratifolium* (Card.) Broth., *Macromitrium ceylanicum* Mitt., and *Mniodendron humile* Lindb. Critical notes accompany several of the species.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA,
AND MYXOMYCETESH. M. FITZPATRICK, *Editor*D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 1031, 1032, 1033, 1103, 1375, 1401, 1412, 1413, 1435, 1436, 1455, 1456, 1492 and those in Section Pathology)

FUNGI

1135. ANONYMOUS. Haslemere spring foray. *Trans. British Mycol. Soc.* 7: 221-224. 1922.—The annual spring foray, which was held at Haslemere, Surrey, May 13-16, 1921, is reported and a complete list is given of the fungi collected, numbering about 232 species.—*W. B. McDougall.*

1136. ARTHUR, JOSEPH CHARLES. New species of Uredineae—XIV. *Bull. Torrey Bot. Club* 49: 189-196. 1922.—The following descriptions and nomenclatorial changes are made: *Bullaria Zorniae* (Dietel) comb. nov., *Melampsoropsis roanensis* sp. nov., *Cronartium stalactiforme* Arthur & Kern comb. nov., *Diabole* gen. nov., *D. cubensis* comb. nov., *Puccinia Pluchae* (Sydow) comb. nov., *Uredo nominata* sp. nov., *U. cumula* sp. nov., *U. curvata* sp. nov., *Aecidium Yuccae* sp. nov.—*P. A. Munz.*

1137. ARTHUR, J. C. Uredinales collected by R. Thaxter and J. B. Rorer in Trinidad. *Bot. Gaz.* 73: 58-69. *Fig. 1-4.* 1922.—The author presents a list of 41 known species and 3 new ones; *Cerotelium minutum* on undetermined Bignoniaceous host, *Puccinia corticola* on *Cordia Gerascanthus* L., and *Maravalia pallida* on *Pithecolobium latifolium* (L.) Benth. The last is the type of a new genus.—*D. S. Welch.*

1138. AZOULAY, LÉON. Détermination instantanée de la couleur des spores. [A quick method for determining spore color.] *Bull. Trimest. Soc. Mycol. France* 37: 146-148. 1921.—This may be accomplished by passing between the gills some object to which the spores will adhere. Black and white paper, cloth, feathers, or brushes are suggested. A greater quantity of spores may be obtained by means of a small water-color brush slightly moistened. In testing specimens with milky juice it is necessary to use both black and white paper, the true spore color being given by the spots on the paper which are pulverulent and easily removed by brushing with the finger. In mature specimens the spores may be caught by placing the cap, gills downward, on a smooth surface from which the spores may later be removed by brushing and transferred to a testing surface.—*D. S. Welch.*

1139. BAKER, C. F. Additions to Philippine and Malayan technical bibliography. *Philippine Agric.* 10: 363-366. 1922.—Eleven citations to mycological contributions are given which are to be added to the bibliographical list published earlier [see *Bot. Absts.* 5, Entry 1238]. The titles consist of published studies based wholly, or in part, on the material of Philippine and Malayan fungi brought together by C. F. Baker. The bibliography also contains many citations to similar entomological contributions.—*Sam F. Trelease.*

1140. BARBIER, M. Découverte du *Secotium acuminatum* Mtg. près de Dijon (Côte d'Or). [The discovery of *Secotium acuminatum* Montagne near Dijon (Gold Coast).] *Bull. Trimest. Soc. Mycol. France* 38: 29-30. *1 fig.* 1922.—A note is given on the collection of this rare fungus together with a description of the same.—*D. S. Welch.*

1141. BONAR, LEE. An albino mutation of the dematiaceous fungus *Brachysporium Trifolii*. *Science* 56: 226-227. 1922.—The dark brown hyphae lost their color in one sector of growth in a culture. For 16 non-sexual generations this strain has persisted. No sexual stage has been obtained in either the normal or the albino strain.—*C. J. Lyon.*

1142. BONNS, WALTER W. A preliminary study of *Claviceps purpurea* in culture. Amer. Jour. Bot. 9: 339-353. 6 pl. 1922.—*Claviceps purpurea* was grown in culture on agar, vegetable plugs, and various mashes. Results agree with those of previous workers except as to conditions producing certain morphological variations. A stage showing structure analogous to that of the natural sclerotium was produced. The conidial stage may develop directly from the sclerotium without germination and without the formation of ascospores. An extract of the culture-grown fungus was tested for 3 of the chief active principles of ergot—tyramine, histamine, and ergotoxine—and the presence was demonstrated of histamine only. A much larger amount of material should be grown and studied before its chemical composition can be determined with accuracy. It seems doubtful whether the artificial culture of *Claviceps* is practical commercially.—E. W. Sinnott.

1143. BOSE, S. R. Descriptions of some polypores new to Bengal. Proc. Sci. Convention Indian Assoc. Cultivation Sci. 1919: 55-62. Pl. 1-6. 1922.—The paper constitutes Part IV of Bengal Polyporaceae, which is being published serially. The following 7 species collected in different parts of Bengal are described, and figures illustrating both the upper and lower surfaces of the fruit-body are given for each: *Lenzites alutaceus*, *Polyporus rhizophorae*, *P. rigidus*, *Polystictus xanthopus*, *P. flabelliformis*, *P. suboccidentalis*, and *Trametes Meyenii*. Of these the 4th and 5th were also collected in Madras.—S. R. Bose.

1144. BOSE, S. R. Polyporaceae of Bengal. Part V. Bull. Carmichael Medical College 3: 20-25. Pl. 1-9. 1922.—Twelve species representing the genera *Fomes*, *Polyporus*, *Polystictus*, *Trametes*, and *Daedalea*, collected in Bengal, Assam, and Madras, are described and figured.—S. R. Bose.

1145. BRÉBINAUD, P. Bolets à pores rouges et Russules rouges. [Red pored Boleti and red Russulas.] Bull. Trimest. Soc. Mycol. France 37: 149-155. 1921.—*Boletus purpureus* (Fr.) is described with synonymy. Changes in color of pileus are due to variations in moisture. This also applies to other fungi with flesh changing color on exposure to air. Among certain species of *Russula* external conditions appear to govern the amount of coloring on the pileus. The formation of reticulations and dots at the base of the stipe in Boleti is due to the rupturing of the tubes or hyphae which in the beginning are attached to the base of the stipe. Thus the coloring of the reticulations and of the pores in the younger stages is believed to be a process of oxidation of freshly exposed tissue. Two types of subterranean mycelia are distinguished, one nutritive, the other for respiration. In the ground the mycelium is found mostly in holes made by insects or in areas loosened by burrowing animals or other agencies.—D. S. Welch.

1146. BROOKS, R. ST. JOHN. The national collection of type cultures. Trans. British Mycol. Soc. 7: 237-239. 1922.—The national collection of type cultures which is located at the Lister Institute of Preventive Medicine was formed in January 1921 and since that time "some twelve hundred strains of microorganisms of medical, veterinary and economic importance have been incorporated in the collection and cultures have been distributed to workers at home and abroad at the rate of about two thousand per annum." More recently the scope of the national collection has been extended to include cultures of representative fungi.—W. B. McDougall.

1147. BULLER, A. H. R. The basidial and Oldial fruit-bodies of *Dacryomyces deliquescentis*. Trans. British Mycol. Soc. 7: 226-230. 1921.—*Dacryomyces deliquescentis* produces 2 kinds of fruit-bodies, one orange colored and bearing oidia, the other yellow and producing basidiospores. These 2 kinds of fruit-bodies were originally described as separate species, and in order to clear up the confusion arising from this fact the plant is here redescribed in detail.—W. B. McDougall.

1148. BURT, E. A. Some North American Tremellaceae, Dacryomycetaceae, and Auriculariaceae. Ann. Missouri Bot. Gard. 8: 361-396. Pl. 3, figs. 1-6. 1921.—Burt has compared

Vermont collections with authentic specimens of tremellaceous fungi in the Schweinitz herbarium and has studied species in this group described by Berkeley & Curtis, Peck, and others. His notes are presented on 16 species included in the Tremellaceae, 9 in the Dacryomycetaceae, and 4 in the Auriculariaceae. *Heterochaete microspora*, *Auricularia rosea*, and *Helicobasidium Peckii* are described as new species, while there are 9 new combinations, in which *Peziza concrescens* Schw. becomes *Tremella concrescens* Schw. Burt, *Exidiopsis alba* Lloyd becomes *Exidia alba* (Lloyd) Burt, *Tremella nucleata* Schw. becomes *Exidia nucleata* (Schw.) Burt, *Tremella aurantia* Schw. becomes *Naematelia aurantia* (Schw.) Burt, *Sebacina Sheari* Burt becomes *Heterochaete Sheari* Burt, *Tremella palmata* Schw. becomes *Dacryomyces palmatus* (Schw.) Burt, *Tremella subochracea* Peck becomes *Dacryomyces subochracea* (Pk.) Burt, *Tremella stipitata* Peck becomes *Dacryomitra stipitata* (Peck) Burt, and *Exidia pedunculata* Berkeley & Curtis becomes *Dacryomitra pedunculata* (B.&C.) Burt.—S. M. Zeller.

1149. BURT, E. A. The North American species of *Clavaria*, with illustrations of the type specimens. Ann. Missouri Bot. Gard. 9: 1-78. Pl 1-11. 1922.—In this contribution Burt gives helpful suggestions to collectors of coral fungi. In the various sections of North America collections should be taken with careful records as to color, odor, taste, and spore characters of fresh specimens. Colors should be standardized by comparison with some chart, as Ridgway's, and spore collections made in some standard way, as on glass, with records of the color values *en masse* when fresh. Mature specimens which shower spores freely are much preferred to the immature collections which often "clutter up herbaria and waste valuable time." Burt has brought together the original descriptions (together with his notes) of North American species, their spore characters, and photographic illustrations of the type specimens. Notes on such exotic species from South America and the North Pacific Exploring Expedition as were available for examination have been appended. Among the 98 accepted North American species *Clavaria pinicola*, *C. flavuloides*, *C. mutans*, and *C. pilosa* Burt are described as new. Sixteen species with the original descriptions are listed as "imperfectly known." Eight "excluded species" include new combinations in which *Clavaria ornatipes* Peck becomes *Lachnocladium ornatipes* (Peck) Burt, *Clavaria subcorticalis* Schw. becomes *Lachnocladium subcorticale* (Schw.) Burt, *Clavaria vestipes* Peck becomes *Lachnocladium vestipes* (Peck) Burt, *Clavaria tenax* Schw. becomes *Tremellodendron tenax* (Schw.) Burt, and *Clavaria Typhuloides* Peck becomes *Pistillaria Typhuloides* (Peck) Burt. Six exotic species are listed.—S. M. Zeller.

1150. CORTINI, JONE COMANDUCCI. *Tylomyces gummiparus* n. sp. prototipo di un nuovo genere di Ifomiceti. Caratteri morfologici. Nota I. [*Tylomyces gummiparus* n. sp. prototype of a new genus of the Hyphomycetes. Morphological characters. Note I.] Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.) 30²: 63-66. Fig. 1-14. 1921.—A hyphomycetous fungus referable to the family Dematiaceae, section Phragmosporae, was found growing saprophytically on *Dianthus Caryophyllus*. The aerial mycelium is more or less covered with irregular brownish scales or plates. The conidia are borne in chains and are formed mesendogously as recently described by Peyronel for another fungus [see Bot. Absts. 12, Entry 1187]. The chains of conidia are peculiar in that the end of one conidium is commonly attached to the side of the next.—F. M. Blodgett.

1151. CORTINI, JONE COMANDUCCI. *Tylomyces gummiparus*. n. sp. prototipo di un nuovo genere di Ifomiceti. Caratteri biologici e sistematica del fungo. Nota II. [*Tylomyces gummiparus* n. sp. prototype of a new genus of Hyphomycetes. Biologic and systematic characters of the fungus. Note II.] Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.) 30²: 113-116. Fig. 15-33. 1921.—The germination of the conidia of *Tylomyces gummiparus* is described in some detail. This fungus is readily grown in culture without losing its characteristic form. Systematically it resembles *Fusariella* Sacc., but the peculiar chains of spores and the scale-like covering of the mycelium leads the author to describe it as the type of a new genus.—F. M. Blodgett.

1152. COURTILLOT, J. Observations sur quelques champignons de la vallée supérieure de la Saône. [Some fungi of the upper Saone valley.] Bull. Trimest. Soc. Mycol. France 38: 31-33. 1922.—Brief notes are given with special reference to odor, taste, and habitat on certain species from the following genera: *Tricholoma*, *Clitocybe*, *Collybia*, *Hygrophorus*, *Russula*, *Pleurotus*, *Hypoloma*, *Coprinus*, *Boletus*, and *Phallus*.—D. S. Welch.

1153. CRÉPIN, CH. Un *Oidium* de la betterave. [An *Oidium* of the beet.] Bull. Soc. Path. Vég. France 9: 118-119. 1 fig. 1922.—The conidia are the same length as those of *Microsphaera Betae* but narrower.—J. Dufrenoy.

1154. DAVIS, W. H. *Urocystis Agropyri* on redtop. Mycologia 14: 279-281. 1 fig. 1922.—The author reports the occurrence of *Urocystis Agropyri* on *Agrostis palustris* collected in Wisconsin, and describes the sori and spores.—H. R. Rosen.

1155. DODGE, B. O. A *Lachnea* with a botryose conidial stage. Bull. Torrey Bot. Club. 49: 301-305. Fig. 1-7. 1922.—*Lachnea abundans* Karst. has asexual fructifications closely resembling *Botrytis*, the connection between the apothecial and conidial stages having been repeatedly established. The suggestion is made that "it is certainly dangerous to place too much weight on the asexual spore forms in determining relationship of their ascogenous stages."—P. A. Munz.

1156. DODGE, B. O. Studies in the genus *Gymnosporangium*. IV. Distribution of the mycelium and the subcuticular origin of the telium in *G. clavipes*. Amer. Jour. Bot. 9: 354-365. 1 pl., 7 fig. 1922.—Primary infection of *Gymnosporangium clavipes* on *Juniperus virginianum* occurs in the cuticularized layer of the epidermal cells of leaves and young stems. As the season advances, the hyphae penetrate into the mesophyll. In cork-covered stems the parasite is generally confined to the 2 or 3 outermost cell layers of the cortex. The main trunk may become infected by downward growth of hyphae from an infected branch. Characteristic binucleate haustoria occur in the cells of the epidermis and mesophyll. The first sori always appear either directly on the leaves or, more commonly, on the stems at the margins of the decurrent leaf bases or in the leaf axils. In later years, as cork is laid down on the stem, the sori are formed and break through in the ordinary manner. Sori on leaves and young stems are subcuticular to the extent that they arise in the cuticularized layer of the epidermal cells. As in other species studied by the author, the teliospore buds grow out from the subterminal cells of the basal primordium. The terminal cells, having become disorganized and swollen, function as buffer cells.—E. W. Sinnott.

1157. DOIDGE, ETHEL M. South African Ascomycetes in the National Herbarium. Part 2. Bothalia 1: 65-82. Fig. 1-8. 1922.—Thirty-five fungi are described including the following new species: *Catacauma Schotiae*, *Dictyochorella Andropogonis*, *Phyllachora Tecleae*, *P. myrsinicola*, *Telimena Arundinariae*, *T. corticola*, *Systemma Pterocarpi*, *Meliola Carissae*, *M. oleicola*, *M. gemellipoda*, *Calothyrium Psychotriae*, *Asterina Crotonicola*, *A. Scolopiae*, *Lembosia priensis*, *Trichopeltula Carissae*, *T. kentaniensis*, *Scolecopeltis Cassipoureae*, *Asterinella Minusopsidis*, *Irene Rinorea*, *I. Zeyheri*, *Clypeosphaeria natalensis*.—E. M. Doidge.

1158. DOSDALL, LOUISE. Occurrence of the pycnial stage of *Puccinia Taraxaci*. Bull. Torrey Bot. Club 49: 235-236. 1922.—The pycnial stage of *Puccinia Taraxaci* (Rabent.) Plow. is reported from Minnesota and Indiana and a description is given.—P. A. Munz.

1159. ELLIOTT, JESSIE S. BAYLISS. Studies in discomycetes. III. Trans. British Mycol. Soc. 7: 293-298. Fig. 1-2. 1922.—Ten species of discomycetes found in England are discussed.—W. B. McDougall.

1160. ELLIOTT, JOHN A. Some characters of the southern tuckahoe. Mycologia 14: 222-227. Pl. 17-18, fig. 1-2. 1922.—Clamp connections are noted on the mycelium, suggest-

ing a basidiomycete. A cut sclerotium imbedded in a greenhouse bench and later dug out showed a blackish root-like growth from the cut surface. When broken this rhizomorph exuded a milky fluid. Cultures from the peripheral regions of the sclerotium on cornmeal agar appeared as dark-brown, sterile, felty growths. Microscopic sections of the sclerotium show lactiferous ducts and glands.—*H. R. Rosen.*

1161. FAIRMAN, CHARLES E. New or rare fungi from various localities. *Proc. Rochester Acad. Sci.* 6: 117-139. *Pl.* 21-23. 1922.—The following are described as new: *Phomopsis rubiseda*, *P. fraterna*, *P. Trollii*, *Dendrophoma nigrescens*, *Sphaeronema epicaulon*, *Cytospora Nyssae*, *Sphaeropsis subconfluens*, *S. Opuntiae*, *Coniothyrium praeclarum*, *Didymochaeta columbiana*, *Microdiplodia ilicigena*, *Stagonospora nyssaecola*, *Hendersonia Arundinariae*, *Rhabdospora ilicigena*, *R. cryptosporopsis*, *Leptostroma Mitchellae*, *Heteropatella acerina*, *Discella zythiacea*, *Didymosporium propolidioides*, *Scolecosporium transversum*, *Graphium sordidiceps*, *Anthostomella endoryloides*, *Diaporthe Hamamelidis*, *Didymosphaeria Lonicerae* var. *riparia*, *Melanomma nigriseda*, *Leptosphaeria lyciophila*, *L. Hamamelidis*, *L. pseudohleria*, *Sporormia ourasca*, *Cucurbitaria rimulina*, *Gloniopsis Lathamii*, *G. Lathamii* var. *asymetrica*, *Clasterosporium larviforme*, *Hendersonia foliorum* var. *hamamelidina*, *Cladosporium punctulatum* var. *xylogenum*, *Stemphylium subsphaericum*, *Exosporium scolecomorphum*, *Phoma Dioscoreae*. Two new genera, *Gamonaemella* and *Amblyosporiopsis*, each represented by a single new species, *G. divergens* and *A. parasphenoides* respectively, are described. The 1st differs from *Gamospora* in having smooth pycnidia, the 2nd differs from *Amblyosporium* in having the conidiophores apically dilated into heads and in having spores truncate only at one end.—*H. M. Fitzpatrick.*

1162. FAIRMAN, CHARLES E. The fungi of our common nuts and pits. *Proc. Rochester Acad. Sci.* 6: 73-115. *Pl.* 15-20. 1921.—The following new species or varieties are described: *Phomopsis carposchiza*, *Macrophoma Fitzpatrickiana*, *Rhabdospora baculum* var. *nucimaculans*, *Vermicularia exocarpinella*, *V. putaminicrustans*, *Pyrenochaeta nucinata*, *Dothiorella nucis*, *Sphaeropsis pallidula*, *Diplodina epicarya*, *Stagonospora nuciseda*, *S. nucicidia*, *Pestalozzia nuciseda*, *Voluella caryogena*, *Cylindrium gossypinum*, *Monosporium avellaneum*, *Septocylindrium nuculinum*, *Coniosporium nucifoedum*, *Didymella nucis-hicoriae*, *Melanopsamma Amphisphaeria* var. *carpogena*, *M. subrhombispora*, *Didymosphaeria nuciseda*, *Rhyncostoma nucis*, *Amphisphaeria nucidoma*, *Zignoella nucivora*, *Rhynchosphaeria nucicola*, *Leptosphaeria exocarpogena*, *L. cacuminispora*, *Karschia elaeospora*. *Sphaeropsis Aesculi* Faut. & Roum. is transferred to the genus *Haplosporella*. A new genus, *Schizocapnodium* is described. Its affinities are in doubt, but it is placed near the Capnodiaceae. The spore split longitudinally, the halves falling apart. Many previously described species are here discussed.—*D. S. Welch.*

1163. FERDINANDSEN, C. En Blomkaalssvamp inden Dore (*Coniophora puteana*). [An indoor development of a fungus resembling Sparassis.] *Meddelel. For. Svampek. Fremme* 2: 104-105. 2 pl. 1920.—The author discusses a monstrosity of *Coniophora puteana* found growing on pine and spruce timbers under a floor. The largest specimens measured 9×6½ cm., weighed only 8.2 gm., and resembled a dry sponge in appearance.—*C. Ferdinandsen.*

1164. FERDINANDSEN, C., OG Ø. WINGE. En ny Kampeform af Elme Østershat (*Pleurotus ulmarius* (Bull.) Fr. f. *gigantea* nov. form.). [A new giant form of *Pleurotus ulmarius*.] *Meddelel. For. Svampek. Fremme* 2: 101-103. 1 fig. 1920.—The authors figure and give a Latin description of this monstrous agaric. The pileus reaches a diameter of 37 cm. and the stipe attains a length of 67 cm. The fungus was found in 3 succeeding years, late in autumn, in a Danish park. The fruit-bodies were partly hidden in, and partly emerging from, cavities in an old elm tree.—*C. Ferdinandsen.*

1165. FRASER, W. P. Cultures of heteroecious rusts, 1920-1921. *Mycologia* 14: 228-230. 1922.—"Inoculations with teliospores from *Spartina pectinata* Bosc. produced pycnia and

aecia on *Glaux maritima* L.," adding a new aecial host to *Puccinia Distichlidis*. Teliospores from *Distichlis stricta* produced pycnia and aecia on *Glaux maritima* and *Plantago eriopoda*, adding 2 new aecial hosts to the "pluriverous" rust, *Puccinia subnitens*.—H. R. Rosen.

1166. GRAFF, PAUL W. **Philippine Basidiomycetes**—V. Bull. Torrey Bot. Club 49: 223-233. 1922.—The Polyporeae are completed and records are given for many species. *Daedalea versatilis* (Berk.), *Hexagonia Clemensiae* (Murr.), *H. subrubida* (Murr.), and *Gloeoporus reticulatus* (Fr.) are published as new combinations. In the Agaricineae various notes are given.—P. A. Munz.

1167. HASLER, ALFRED. Über die Entwicklungsgeschichte einiger Rostpilze. [On the life-histories of certain rusts.] Centralbl. Bakt. II. Abt. 54: 35-50. 1921.—The paper describes cultural studies on *Puccinia Lactucarum* and the following *Carex* rusts: *Puccinia serratulae-caricis* Kleb. on *Carex fulva* and *C. flava*; *P. urticae-pilosae* forma specialis on *Carex pilosa* and *C. frigida*; and *P. urticaefrigidae* on *Carex frigida* and *C. ferruginea*.—M. A. Raines.

1168. HEDGCOCK, GEORGE G., AND N. REX HUNT. Notes on some species of *Coleosporium* —I. Mycologia 14: 244-257. Pl. 20-21. 1922.—In order to prove or disprove the theory that species of pine act as bridging hosts for different species of *Coleosporium*, numerous inoculations were made, some of which are now recorded. It is shown that aeciospores and urediniospores of *C. Helianthi* can infect numerous species of *Helianthus*, but do not infect other composites, and in particular it was found that various species of *Coreopsis* were not infected. Likewise, aeciospores and urediniospores of *Coleosporium inconspicuum* infected only species of *Coreopsis*. This indicates that *Coleosporium Helianthi* and *C. inconspicuum* are distinct species. It is also found that *C. Helianthi* has a much wider distribution. The pycnial and aecial stages of *C. terebinthinaceae* and *C. laciniariae* are compared, and hosts of the former species are presented together with the geographic distribution. Numerous inoculation experiments with *C. delicatulum* indicate that only species of *Euthamia* act as uredinial and telial hosts and that various species of *Pinus* are susceptible. A list of hosts and geographic distribution are given for this species.—H. R. Rosen.

1169. HÖHNEL, F. VON. Vierte vorläufige Mitteilung mycologischer Ergebnisse (Nr. 305-398). [Fourth preliminary report of the results of mycological investigations.] Ber. Deutsch. Bot. Ges. 37: 107-115. 1919.—In this continuation of notes from Vol. 36 of this publication the author lists many genera and species with changes and corrections in synonymy. The names of the following genera appear: *Agaricus* (*Tricholoma*), *Russula*, *Peziza*, *Ungicularia*, *Urceolella*, *Niptera*, *Pyrenopeziza*, *Mollisia*, *Dermatella*, *Cenangella*, *Belonidium*, *Tapesina*, *Chalara*, *Polydesmia*, *Leptobelonium*, *Belonium*, *Trichobelonium*, *Niesslella*, *Belonopsis*, (there is no morphological basis for the family *Caliciaceae*), *Stenocybe*, *Beloniocypha*, *Scelobelonium*, *Caliciopsis* (*Coryneliaceae*), *Capnodiella*, *Hypsotheca*, *Sorica*, *Sphinctrina*, *Phialea*, *Cyphelium*, *Scleroderis*, *Acolium* (*Cenangiaceae*), *Calicium*, *Coniocybe*, *Neolecta*, *Biatorella*, *Tromera* (*Helotiaceae*), *Steinia*, *Comesia* (*Comesiella*), *Patellea* *Tapesia*, *Helotium*, *Patinella*, *Pseudohelotium*, *Tympanis*, *Godronia*, *Asterocalyx*, (*Tryblidiaceae*), *Arachnopeziza*, *Gorgoniceps*, *Eriopeziza* (*Trichopezizaceae*), *Pezizella*, *Ctenoscypha*, *Habrostictis*, *Pseudopeziza*, *Excipula*, *Orbilbia*, *Orbiliopsis*, *Mollisia*, *Calycellina*, *Helotiopsis*, *Eubelonis*, *Phialina*, *Lachnobelonium*, *Dasysecypha*, *Dasypezis*, *Psilachnum*, *Dyslachnum*, *Tubereularia*, *Beloniella*, *Belonopeziza*, *Cenangium*, *Nectria* (*Gibbera*), *Nitschkia*, *Melanomma*, *Phyllachora*, *Polystigma*, *Clypeostigma*, *Echusias*, *Fracchiaca*, *Asterella*, *Microthyrium*, *Microthyriella*, *Myriocopron*, *Ellisiodothis*, *Microdothella*, *Melanobasidium*, *Calothyrium*, *Leptopeltis*, *Palawania* (*Polystommellaceae*), *Seynesia*, *Phragmothyrium*, *Calothyriopsis*, *Clypeolella*, *Lichenopeltella*, *Leptopeltella*, *Didymella*, *Othiella*, *Keissleriella* (*Cucurbitariaceae*), *Eriosphaeria*, *Melanopsamma*, *Melanopsammella*, *Gonytrichum*, *Acrospermum*, *Bombardiastrum*, *Cyanoderma*, *Barya*, *Torru-biella*, *Ophionectria*, *Tubeufia*, *Physosporrellaceae* n. fam. (*Sphaeriaceae*), *Pemphidium*, *Merillio-peltis*, *Oxydothis*, *Griphosphaeria*, *Anisostomula*, *Physospora*, *Ceriospora*, *Lejosphae-*

rella, *Miyakeamyces*, *Calonectria* (*Puttemansia*), *Diaporthe*, *Othia*, *Cucurbitaria*, *Diatrype*, *Valsa* (*Leucostoma*), *Kalmusia*, *Leptosphaeria*, *Nodulisphaeria*, *Sphaeria*, *Sphaerella*, *Laestadia*, *Phacidium*, *Gnomonia*, *Ditopella*, *Rehmiella*, *Scleroplella*, *Discochora*, *Physalospora*, *Carlia*, *Phaeobotryon*, *Macrophoma* (*Coleophoma*), *Macrospora*, *Clathrospora*, *Rehmiellopsis*, *Mycosphaerella*, *Diplosphaerella*, *Hariotia*, *Hypostegium* *Catacauma*, *Fusarium*, *Cryptosporium*, *Phyllosticta*, *Glocosporium*, *Aulacostroma*, *Lembosiodothis*, *Zignoëlla*, *Gilletiella*, *Haplothe-ciella*, *Cladosporium*, *Stilbum*, *Dacryomyces*, *Dendrodochium*, *Microdiscula*, *Dendrophoma*, *Blennoria*, *Phyllostictina*, *Asteromella*, *Plectophoma*, *Stictochorella*, ***Dasystictella***, *Dasysticta*, *Aposphaeria*, *Cylindrophoma*, *Coleophoma* *Ceuthospora*, *Phoma*, *Septoria*, *Sphaeropsis*, *Hender-sonia* (*Sphaerospora*), ***Naemostroma***, *Hysterium*, *Sclerophoma*, *Sporonaema*, *Discella*, *Gloeosporium*, *Discosporium*, *Pezizala*, *Ocellaria*, *Tuberculariella*, *Melanconis*, ***Discosporina***, *Hymenula*, *Gloeosporidium*, ***Myxosporina***, *Hysterostegiella*. In addition to the new genera included above (bold-faced type) the following new species are mentioned: *Keissleriella Aesculi*, *Acrospermum Adeanum*, *Othia Rubi*.—D. S. Welch.

1170. KILLERMANN, S. *Funde von einigen Britzelmayrschen Cortinari.* [Discovery of some of Britzelmayr's species of *Cortinarius*.] *Krypt. Forsch. Bayer. Bot. Ges. München* 5: 361-362. 1920.—During the last decade of the 19th century Britzelmayr described 72 new species of *Cortinarius*, most of which are now regarded as forms of previously described species. In the author's opinion, however, the following are valid: *C. albidocyaneus*, *C. apparens*, *C. disputabilis*, *C. evestigatus*, *C. odorifer*, *C. percognitus*, and *C. unimodus*. These species, together with *C. Cookei* Quél. and *C. splendidus* Peck, are briefly described from Bavarian material.—A. W. Evans.

1171. KILLERMANN, S. *Morcheln und andere Helvellaceen aus Bayern.* [Morels and other Helvellaceae from Bavaria.] *Krypt. Forsch. Bayer. Bot. Ges. München* 3: 148-154. 1 fig. 1918.—Following the example of Rehm, the author divides the Bavarian Helvellaceae upon which his report is based into the Rhizineae, the Geoglosseae, and the Helvelleae. Under the Rhizineae he lists a single species; under the Geoglosseae, 13 species in 9 genera; and under the Helvelleae, 22 species in 3 genera. Each species is accompanied by data regarding stations and collectors, by references to the literature, and usually by critical or descriptive notes. The figure represents a new form of *Mitrlula Rehmi* Bres., but no other novelties are described.—A. W. Evans.

1172. KILLERMANN, S. *Nachtrag zu meinen trüffel- und Morchelfunden.* [Additions to my discoveries of truffles and morels.] *Krypt. Forsch. Bayer. Bot. Ges. München* 4: 335-336. 1919.—The author publishes notes on 3 hypogaeous fungi and 4 members of the Helvellaceae found in various parts of Bavaria, 2 of which represent additions to the flora.—A. W. Evans.

1173. KILLERMANN, S. *Ueber den Hexenpilz (Boletus luridus Schöff.) und Verwandte.* [On the witch fungus (*Boletus luridus*) and its allies.] *Krypt. Forsch. Bayer. Bot. Ges. München* 4: 336-343. 3 fig. 1919.—The author discusses certain Bavarian species of *Boletus* belonging to the groups *Luridi* and *Colpodes* of Fries. In the 1st group he recognizes *B. luridus* Schaff., *B. rubeolaris* Bull., and *B. Satanus* Lenz as valid and, in the 2nd group, *B. pachypus* Fr., *B. calopus* Fr., and *B. torosus* Fr., although he expresses the opinion that the last may perhaps be a young form of *B. Satanus*. Under *B. rubeolaris* he includes *B. Lorinseri* G. Beck and *B. suspectus* as synonyms and *B. erythropus* (Pers.) Fr. as a variety, and under *B. Satanus* includes *B. macrosporus* Britzelmayr as a synonym and *B. lupinus* Fr. as a variety. The status of *B. appendiculatus*, *B. terreus*, and *B. olivaceus*, species proposed by Schäffer, is not altogether certain. The 1st, however, may be a form of the variable *B. subtomentosus* L., while the other 2 probably represent *B. calopus*. Full references to the literature accompany the article.—A. W. Evans.

1174. KINZEL, WILHELM. *Über Hexenringe und die Bedingungen ihrer Entstehung.* [On fairy rings and the conditions necessary for their formation.] *Krypt. Forsch. Bayer. Bot.*

Ges. München 3: 154-164. 1918.—The author describes the appearance of the so-called "fairy rings," caused for the most part by basidiomycetous fungi, and shows how they increase in size. He then discusses the conditions necessary for their formation and compares them with the rings of growth formed in artificial cultures by *Monilia fructigena* and similar fungi. The infection experiments carried out in the open by Münch, whereby fairy rings were artificially produced, bring out some of the most striking similarities between these 2 types of growth. At the close of the paper 22 species of fungi, associated with the formation of fairy rings, are enumerated.—A. W. Evans.

1175. KRIEGER, LOUIS C. C. Common mushrooms of the United States. Nation. Geog. Mag. 37: 387-439. 16 pl., 38 fig. 1920.—A non-technical discussion of mushrooms with descriptions is given as a basis for identification. Emphasis is placed on the question of edibility.—W. M. Atwood.

1176. MACCALLUM, B. D. Some wood-staining fungi. Trans. British Mycol. Soc. 7: 231-236. Pl. 8-9. 1922.—A brief historical review is followed by an account of the life history of *Ceratostomella Piceae*. Evidence is presented in support of the view that *Graphium penicillioides* is a stage in the life history of *Ceratostomella Piceae*.—W. B. McDougall.

1177. MAGNIN, HENRI. Récolte printanière de *Psalliota campestris* L. [An early collection of *Psalliota campestris*.] Bull. Trimest. Soc. Mycol. France 38: 56. 1922.—This fungus appeared March 15 in a garden which had been heavily manured the preceding November.—D. S. Welch.

1178. MANGENOT, G. A propos de quelques formes peu connues d'Endomycétacées. [Concerning some little known Endomycetaceae.] Bull. Trimest. Soc. Mycol. France 38: 42-55. Pl. 1-2, fig. 1. 1922.—*Endomyces Javanensis* Klöcker has a yeast-like mycelium and produces asci without a sexual process. *Endomyces Lindneri* Saito is typically parthenogenetic, but cases are found varying from permanent fusion of gametes (without nuclear fusion) to total absence of gametes. Parthenogenetic gametes frequently develop an ascogenous hypha, often only a single cell. This perhaps indicates the place of origin of this structure in the phylogeny of the Ascomycetes. *Endomyces Hordei* is closely related to the above but is always parthenogenetic.—D. S. Welch.

1179. MARTIN, GEORGE W. Rhizophidium Polysiphoniae (Cohn) Peterson in the United States. Bot. Gaz. 73: 236-238. Fig. 1-10. 1922.—The author reports the occurrence of and describes the above species from a specimen of *Callithamnion* received from Barnegat Bay, New Jersey.—B. W. Wells.

1180. MAYOR, EUG. Une espèce biologique nouvelle du type de *Puccinia sessilis* Schneider. [A new biologic species of *Puccinia sessilis*.] Bull. Trimest. Soc. Mycol. France 38: 34-41. 1922.—*Puccinia Smilacearum-Festucae* is described with the following hosts: O and I found in nature on *Paris quadrifolia*, *Convallaria majalis*, *Polygonatum multiflorum*, *P. verticillatum*, and obtained in culture on *P. officinale*. The acedial stage shows no biologic specialization. II and III develop only on *Festuca sativa*.—D. S. Welch.

1181. MOUNCE, IRENE. Homothallism and heterothallism in the genus *Coprinus*. Trans. British Mycol. Soc. 7: 256-269. 1922.—In continuing her previous studies on the genus *Coprinus*, the author concludes that *Coprinus sterquilinus* and *C. stercorarius* are homothallic whereas *C. lagopus* and *C. niveus* are heterothallic. Both of the latter probably sometimes give rise to homothallic strains.—W. B. McDougall.

1182. MURRILL, WILLIAM A. Dark-spored agarics—III. Agaricus. Mycologia 14: 200-221. 1922.—This is a key to 30 species of *Agaricus* with a description of each. Three new species are recognized: *A. alabamensis*, *A. comtuliformis*, and *A. rubribrunnescens*.—H. R. Rosen.

1183. MURRILL, WILLIAM A. Dark-spored agarics—IV. *Deconica*, *Atylospora*, and *Psathyrella*. *Mycologia* 14: 258-278. 1922.—The present article deals with dark-spored agarics having a slender, tubular stipe with cartilaginous cortex, and not furnished with an annulus. Those having decurrent gills are placed in the genus *Deconica*, 9 species being listed, including *D. tomentosa* sp. nov., *D. polytrichophila* (Peck) comb. nov., and *D. pyrispora* sp. nov. Of the forms having adnate or adnexed gills those with purplish-brown or dark-fuscous spores are placed in the genus *Atylospora* (*Psathyra*), in which 7 species are recognized: *A. microsperma* (Peck) comb. nov., *A. vestita* (Peck) comb. nov., *A. multipedata* (Peck) comb. nov., *A. prunuliformis* sp. nov., *A. australis* sp. nov., *A. umbonata* (Peck) comb. nov., and *A. striatula* sp. nov. Seventeen black-spored species are placed in *Psathyrella*, including *P. castaneicolor* sp. nov., *P. petasiformis* sp. nov., and *P. distantifolia* sp. nov.—H. R. Rosen.

1184. OVERHOLTS, L. O. Mycological notes for 1920. *Bull. Torrey Bot. Club* 49: 163-173. Pl. 9, fig. 1-14. 1922.—Notes and records are given for *Zythia resinæ* (Ehrenb.) Karst., *Biotorella resinæ* (Fr.) Mudd, *Pilacre Petersii* B. & Br., *Tulasnella Violæ* (Quél.) Boud. & Gal., *Dacryomyces hyalina* Quél., *Stereum radiatum* Peck, *Merulius fugax* Fr., *Solenia fasciculata* (Pers.) Fr., *Polyporus caeruloporus* Peck, and *Fomes Bakeri* Murrill. *Polyporus compactus* is described as a new species.—P. A. Munz.

1185. PAUL, H. Vorarbeiten zu einer Rostpilz- (Uredineen-) Flora Bayerns. 2. Beobachtungen aus den Jahren 1917 und 1918, sowie Nachträge zu 1915 und 1916. [Preliminary studies for a rust flora of Bavaria. 2. Observations for the years 1917 and 1918, as well as additions for 1915 and 1916.] *Krypt. Forsch. Bayer. Bot. Ges. München* 4: 299-334. 1919.—The 1st paper of this series, dealing with observations on the rust flora of Bavaria for the years 1915 and 1916, appeared in 1917. In the 2nd paper most of the observations recorded are for 1917 and 1918 although a few of earlier date are included. The species listed total 281 and increase the number of rusts now known in Bavaria to over 300. The genera recognized number 21, those best represented being *Puccinia*, *Uromyces*, and *Melampsora*. Each species is accompanied by full data regarding stations, collectors' names, dates, host-plants, and (where necessary) types of spore-forms collected.—A. W. Evans.

1186. PEYRONEL, BENIAMINO. Nouveaux cas de rapports mycorrhiziques entre Phanerogames et Basidiomycètes. [Mycorrhizal relationships between phanerogams and basidiomycetes.] *Bull. Trimest. Soc. Mycol. France* 37: 143-146. 1921.—It is believed that the number of fungi producing mycorrhizae is great. About 20 basidiomycetes have been reported. In an unpublished note the author has pointed out 13 more and in the present paper is given an additional list of 19, mostly from the genera *Amanitopsis*, *Russula*, *Lactarius*, and *Boletus*. Depending upon the nature of the terrain as much as the individual species, both macroscopic and microscopic methods are employed to determine the connection between the mycorrhizal covering (mycochlène) on the host and the hymenophore of the fungus.—D. S. Welch.

1187. PEYRONEL, BENIAMINO. Un ifomicete dai conidi mesoendogeni: *Menispora microspora* n. sp. [A hyphomycete with mesoendogenous conidia: *Menispora microspora* n. sp.] *Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.)* 30⁴: 29-32. Fig. 1-12. 1921.—A hyphomycetous fungus found on chestnut bark is described as *Menispora microspora* n. sp., being distinguished by the small size of the conidia. The latter measure $10-12 \times 1.5-2.25\mu$ for the most part. Flask-shaped bodies (conidiogenes) with a funnel-shaped neck (stomidium) are borne principally at the tips of the conidiophores. The conidia are formed from the protoplasm of the conidiogene, the protoplasm being forced out through the neck to form the spores one after another. These the author calls mesoendogenous conidia.—P. M. Blodgett.

1188. ROSEN, H. R. *Tilletia texana* in Missouri. *Ann. Missouri Bot. Gard.* 8: 357-359. 1921.—The occurrence of this species in Missouri is cited and notes of a monographical nature are given.—S. M. Zeller.

1189. ROSTRUP, OVE. To for Danmark nye Pigsvamp-Arter. [Two *Hydnum* species new to Denmark.] Meddelel. For. Svampek. Fremme 2: 93-95. 2 fig. 1920.—The species in question are *H. aurantiacum* Fr. and *H. friabile* nov. nom. The latter has hitherto been called *H. fragile*. The author gives arguments for the necessity of a new name.—*C. Ferdinandsen*.

1190. SEAVER, FRED J. Studies in tropical Ascomycetes—I. *Neopectia diffusa* and *Herpotrichia albidostoma*. Mycologia 14: 235-238. Pl. 19. 1922.—Synonyms and description of each species are given. The genus *Neopectia* is said to differ from *Herpotrichia* "in that the spores are never more than 1-septate while in the latter they show a tendency to become more than 1-septate."—*H. R. Rosen*.

1191. SHEAR, C. L. Life history of an undescribed ascomycete isolated from a granular mycetoma of man. Mycologia 14: 239-243. 3 fig. 1922.—Crushed granules from diseased tissue of an ankle showed fungus hyphae to be present. Transfers to culture media gave apparently pure cultures of the fungus, although no successful infections resulted when inoculated into guinea pigs. The fungus grows readily on ordinary culture media such as cornmeal agar and in a few weeks produces 3 spore forms, 2 conidial and 1 perithecial. The 1st to appear is a *Cephalosporium* stage, named *C. Boydii*, followed by the perfect stage, *Allescheria Boydii*, which in turn is followed by a coremial form, *Dendrostilbella Boydii*. In the technical description of the fungus the author adopts a system of Roman numerals for the various stages somewhat comparable to the manner in which these are used by uredinologists. Thus I indicates an ascogenous fructification, II a pycnidial stage, III a conidial form; and when more than one pycnidial or conidial form occurs in the life cycle this is indicated by an alphabetical exponent, as III^a and III^b.—*H. R. Rosen*.

1192. SOUTH, F. W. An important root disease on Borneo camphor. Agric. Bull. Federated Malay States 9: 34-36. 1921.—An account is presented of *Rosellinia bunodes* attacking *Dryobalanops Camphora*.—*I. H. Burkill*.

1193. TANAKA, TŌZABURŌ. New Japanese fungi—Notes and translations—XII. Mycologia 14: 282-295. 1922.—The following species of *Gymnosporangium* are described: *G. asiaticum* Miyabe with pycnia and aecia on *Pyrus sinensis* and *Cydonia vulgaris* and telia on *Juniperus chinensis* and *J. chinensis* var. *procumbens*; *G. Yamadae* Miyabe with pycnia and aecia on *Pyrus Malus*, *P. spectabilis*, and *P. Toringo*, and telia on *Juniperus chinensis* and *J. chinensis* var. *procumbens*; *G. Idetae* Yamada ex K. Hara with pycnia and aecia on *Amelanchier asiatica* and telia on *Juniperus rigida*; *G. hemisphaericum* K. Hara with pycnia and aecia on *Pyrus Zumi* and telia on *Juniperus chinensis*; *G. Shiraianum* K. Hara with pycnia and aecia on *Pyrus sinensis* and telia on *Juniperus littoralis*. A synopsis and key are given of Japanese species of *Gymnosporangium*.—*H. R. Rosen*.

1194. VAN HOOK, J. M. Indiana fungi—V. Proc. Indiana Acad. Sci. 1920: 209-214. 1921.—The present paper consists of a list of 68 species of fungi collected in Indiana. Under those listed no attempt has been made to fully describe the species, but variations from original descriptions have been noted or descriptions extended in the following: *Daedalea extensa* Pk., *Ceratostomella barbirostris* (Duf.) Sacc., *C. echinella* E. & E., *Hypoxylon perforatum* (Schw.) Fr., *Phyllosticta Smilacis* E. & E., *Septoria albaniensis* Thuem., *Vermicularia Dematium* (Pers.) Fr. var. *microspora* n. var., *Cylindrosporium Scrophulariae* Sacc. & Ell., *C. Ulmicolum* E. & E., *Gloeosporium Betularum* Ell. & Mart., *Ramularia arvensis* Sacc.—*F. C. Anderson*.

1195. VAN HOOK, J. M. The pycnidium of *Cicinnobolus*. Proc. Indiana Acad. Sci. 1920: 215-216. Fig. 1-3. 1921.—While *Cicinnobolus* has been heretofore described for the most part as infecting only conidiophores, in the case of *Podospheera oxyacanthae* (DC.) de Bary it occurs apparently only on the perithecia, considerably altering their structure.—*J. M. Van Hook*.

1196. WINGE, Ø. Om nogle hyppigt forvekslede Rorhat-Arter. [On certain frequently confused *Boletus* species.] Meddelel. For. Svampekl. Fremme 2: 96-100. 1 fig. 1920.—A brief discussion is given of the characters and identity of 3 Danish species of *Boletus*: *B. aereus* Bull., *B. luridus* Schaeff., and *B. erythropus* Pers.—C. Ferdinandsen.

1197. WORMALD, H. Observations on a discomycete found on medlar fruits. Trans. British Mycol. Soc. 7: 287-293. Figs. 1-2. 1922.—A discomycete found on medlar fruits was found to differ only slightly from *Sclerotinia Mespili* and is believed to be the ascigerous stage of *Mespilus germanica*.—W. B. McDougall.

1198. ZELLER, S. M. Contributions to our knowledge of Oregon fungi—I. Mycologia 14: 173-199. 6 fig. 1922.—A list of 204 species, mostly Eubasidiomycetes, including the following: *Cyphella marginata* McAlpine, reported for the first time in this country on twigs of peach, apple, and almond; *Merulius pilosus* Burt sp. nov., a buff colored species possessing gloeocystidia; *Lepista pulcherrima* sp. nov., possessing a reddish colored pileus and a peronate stem; *Tricholoma subannulata* (Peck) comb. nov., described by Peck as an *Armillaria*; *Stropharia rugomarginata* Zeller & Epling sp. nov., with a reticulate-rugose margin of the pileus; *Scleroderma hypogaeum* sp. nov., possessing alveolate-reticulate spores; and *Gautieria Parksiana* Zeller & Dodge sp. nov.—H. R. Rosen.

LICHENS

1199. BURNHAM, STEWART H. Lichens of the Lake George region. Concluded. Bryologist 25: 72-80. 1922.—The scope of this series of articles has already been outlined [see. Bot. Absts. 11, Entries 4273-4274]. The present installment enumerates 107 species and varieties, with full data of collection. *Haematomma elatinum ochrophaeum* (Tuck.) Merr. & Burn., *Candelaria concolor effusa* (Tuck.) Merr. & Burn., *Parmelia tiliacea subquercifolia* (Hue) Merr. & Burn., *Caloplaca aurantiaca flavovirescens* (Wulf.) Burn., *C. cerina sideritis* (Tuck.) Merr. & Burn., *Physcia fusca detonsa* (Fr.) Burn., *P. orbicularis endococcinea* (Koerb.) Burn., and *Placynthium Petersii* (Tuck.) Burn. are proposed as new combinations.—E. B. Chamberlain.

1200. KNIGHT, H. H. Lichens of Haslemere district. Trans. British Mycol. Soc. 7: 225. 1922.—A list of 66 species of lichens collected near Haslemere, Surrey, during the spring foray of 1921, is given.—W. B. McDougall.

1201. LYNGE, BERNT. Studies on the lichen flora of Norway. Videnskabsselskab. Skrifter (Mat.-Nat. Kl.) 1921: 1-252. Pl. 1-13, fig. 1-5, 65 maps. 1921.—The author recounts the distribution of all non-crustaceous lichens in Norway (with the exception of the *Physcia*-ceae, with which the author has previously dealt [Videnskabsselskab. Skrifter (Mat.-Nat. Kl.) 1916]). Under each species is given a survey of its various subspecies, varieties, and forms belonging to the Norwegian flora, and the distribution of each separate form is represented as accurately as possible. Though the lichen flora of several parts of the country is still imperfectly known, the main features of distribution can be clearly shown in most cases. The new varieties described and new combinations of names established are: *Parmelia Bitteri* nom. nov. (*P. obscurata* Bitter, non Ach.), *P. Bitteri* var. *isidiata* nov. var., *P. Scortea* Ach. f. *borealis* Lynge, *P. fraudans* Nyl. f. *caesiopruinosa* f. n., *P. excrecens* (Arn.) var. *pilosella* comb. nov., *Cetraria lacunosa* f. *norvegica* f. n., *Alectoria samentosa* Ach. f. *sorediata* f. n. Critical remarks or amplified diagnoses are given in many cases. In the preface a brief survey of previous investigations on the lichen flora of Norway is given, and in 2 introductory chapters the author treats of the economic uses of the lichens in Norway and the general features of the distribution of the lichen flora of the country. He divides the species into 2 chief groups: those of the Coast Flora and those of the Inland Flora, each with several subdivisions. The distribution of 65 selected species is represented on the maps accompanying the paper. In an appendix KRISTIAN NISSEN has given a survey of the Lapponian lichen names.—Jens Holmboe.

1202. RUESS, JOHANN. *Die Einteilung der Cladonien.* [The classification of the Cladoniae.] Krypt. Forsch. Bayer. Bot. Ges. München 3: 164-166. 1918.—The author calls attention to the various methods of classification that have been proposed for the species of *Cladonia*, and emphasizes the difficulties of arranging the species of extensive areas in a single system. He therefore recommends classifications adapted to the species of restricted areas, and the method which he here suggests is based on the species of Germany. He divides them into 3 groups, as follows: "Grossblättrige" (large-leaved), referring to the primary thallus, with 4 species; "Kleinblättrige" (small-leaved), with 22 species; and "Krustenflechte" (crustaceous lichen), with 1 species.—A. W. Evans.

BACTERIA

1203. BROWNE, W. W. *Halophilic bacteria.* Proc. Soc. Exp. Biol. and Med. 19: 321-322. 1922.—The red coloration on salt fish is due to 2 organisms, *Spirochaeta halophila* producing a pale pink coloration and *Bacterium halophila* causing a transparent red. Optimum concentration of salt is saturation. The size, shape, and motility of the organisms is dependent upon the salt concentration. The optimum temperature is 50-55°C. Both forms tolerate indefinite exposure to brightest sunlight. They are present in solar evaporated salt. Sea salts from all over the world contain similar organisms.—D. S. Welch.

1204. HELLER, HILDA HEMPL. *Classification of the anaerobic bacteria.* Bot. Gaz. 73: 70-79. 1922.—The previously existing ideas regarding the mutability and stability of anaerobic bacteria are discussed. It is pointed out that if bacteria do not lack one of the best recognized attributes of living matter, they must possess the ability to mutate. Then it is necessary to determine where the mutations of bacteria lie, and what range of characters they cover before it can be determined what characters are stable enough for systematic purposes. It is suggested that the following general rules should be found convenient in classifying bacteria: (1) Strains which differ from each other in characters which are readily subject to mutation and that breed true, may be termed biotypes. (2) Strains which behave alike in those characters that fall within a genus and have not been found to mutate readily, may be grouped as species. (3) Organisms which show the same general reactions on ordinary media and that have the same general morphological habit, may be grouped in genera. The distinguishing characters of 2 sub-families and 1 family including all of the genera are given.—I. V. Shunk.

MYXOMYCETES

1205. SANDERSON, A. R. *Notes on Malayan Mycetozoa.* Trans. British Mycol. Soc. 7: 239-256. 1922.—This paper deals with myxomycetes collected in that part of the Malayan Peninsula which lies between north latitude 1° and 6° and east longitude 100° and 104°. Large tracts of virgin forest in this area have been cut down and the land cleared and set out to plantations of *Hevea brasiliensis* or of coconut. In collecting myxomycetes special attention was given to these plantations. About 70 species are listed, most of them with notes on habitats. Tables are given showing the months in which the various species were collected and the habitats in which they were found.—W. B. McDougall.

1206. SEAVER, F. J. [Rev of: MACBRIDE, T. H. *North American slime-moulds.* 299 p., 23 pl. Macmillan Co: New York, 1922 (see Bot. Absts. 11, Entry 3446).] Mycologia 14: 233-234. 1922.—"In matters of nomenclature the author has not followed hard and fast rules, but has apparently attempted to use the oldest recognizable specific names without regard to rule or date. . . . One other very commendable feature of the book is the extensive notes and observations which supplement the technical descriptions."—H. R. Rosen.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

1207. BERRY, EDWARD W. Contributions to the paleobotany of Peru, Bolivia and Chile. Johns Hopkins Univ. Studies Geol. 4. 219 p., 25 pl., 9 fig. 1922.—This includes the following papers: (1) Carboniferous plants from Peru, the 1st descriptive account of plants of this age from South America. The flora includes: *Palmatopteris furcata*, *Eremopteris whitei*, *Eremopteris peruianus*, *Calamites suckowii*, *Calamostachys* sp., *Lepidodendron rimosum*, *L. obovatum*, *Lepidophyllum* sp., *Lepidostrobus* sp., *Stigmaria* sp., and *Knorria* sp. These occur at Paracas on the southern coast of Peru and indicate a former greater westward extent of the continent and a Westphalian age. (2) The Mesozoic flora of Peru, which contains a summary of the known Mesozoic plants of Peru, representing the genera *Equisetites*, *Taeniopteris*, *Ruffordia*, *Filicites*, *Cladophlebis*, *Sphenopteris*, *Weichselia*, *Klukia*, *Otozamites*, *Zamiostrobus*, *Cycadolepis*, *Podozamites*, *Thuites*, *Brachyphyllum*, and *Antholithus*. *Weichselia peruviana*, *Klukia zeilleri*, *Otozamites peruvianus*, *Otozamites zeilleri*, and *Thuites leptocladus* are described in detail. The age is considered as probably Portlandian. (3) the flora of the Concepcion-Arauco Coal Measures of Chile. This detailed geological and botanical discussion of the lower Miocene flora of the so-called Navidad beds of southern Chile includes 5 ferns representing *Gleicheniaceae*, *Cyatheaceae*, and *Polypodiaceae*; 4 gymnosperms, including *Zamia*, *Araucaria*, and *Sequoia*; 2 palms; and representatives of the following dicotyledonous families: *Piperaceae*, *Moraceae*, *Loranthaceae*, *Anonaceae*, *Myristicaceae*, *Caesalpiniaceae*, *Papilionaceae*, *Erythroxylaceae*, *Rutaceae*, *Meliaceae*, *Vochysaceae*, *Euphorbiaceae*, *Ilicaceae*, *Celastraceae*, *Sapindaceae*, *Tiliaceae*, *Bombacaceae*, *Dilleniaceae*, *Ochnaceae*, *Flacourtiaceae*, *Lauraceae*, *Combretaceae*, *Leechthidaceae*, *Myrtaceae*, *Myrsinaceae*, *Styracaceae*, *Apocynaceae*, *Borraginaceae*, and *Rubiaceae*. New species of *Cyathoides*, *Araucaria*, *Cassia*, *Triumfetta*, *Nectandra*, and *Goepertia* are described. This flora is distinctly Amazonian in character and its bearing on former climatic and geographic conditions and upon the time of uplift of the Andes is fully discussed. (4) Pliocene fossil plants from eastern Bolivia. This flora, found at an altitude of 11,800 feet, includes 3 ferns representing the *Gleicheniaceae* and *Polypodiaceae*; 2 monocotyledons, *Heliconia* and *Iriartites*; and dicotyledons representing the genera *Coussapoa*, *Pisonia*, *Anona*, *Cassia*, *Pithecolobium*, *Pilocarpus*, *Saccoglottis*, *Protium*, *Mespilodaphne*, *Myrica*, *Sideroxylon*, *Chrysophyllum*, and *Cedrela* or *Sapindus*. These are fully discussed in their geological and botanical aspects, and the conclusion is reached that the minimum amount of Andean uplift since this flora lived in this region is 6,500 feet. The following species are described as new: *Goniopteris cochabambensis*, *Filicites elaphoglossoides*, *Gleichenia pectinata fossilis*, *Heliconia tertiaria*, *Iriartites boliviensis*, *Coussapoa pliocenica*, *Pisonia pliocenica*, *Anona cochabambensis*, *Pithecolobium palcanum*, *Cassia pisllypampensis*, *Cassia coriacea*, *Cassia palcana*, *Pilocarpus bolivianus*, *Protium fossilium*, *Saccoglottis tertiaria*, *Mespilodaphne boliviana*, *Myrica pliocenica*, *Sideroxylon pliocenicum*, and *Chrysophyllum crassum*. (5) Late Tertiary plants from Jancocata, Bolivia. Characteristics and geological and climatic bearing of the following new species are discussed: *Pteris pacajensis*, *Phragmites* sp., *Alnus preacuminata*, *Osteomeles kozlowskiana*, *Polylepis tomentellifolia*, *Calliandra jancocatana*, *Cassia altoensis*, *Caesalpinia jancocatana*, and *Melastomites* sp.—E. W. Berry.

1208. BERRY, EDWARD W. Environmental interpretation of fossil plants. Pan Amer. Geol. 38: 9-17. 1922.—The author discusses criteria and methods of interpreting past physical environments by means of fossil plants.—E. W. Berry.

1209. CHANDLER, M. E. J. *Sequoia Couttsiae* Heer, at Hordle, Hants: a study of the characters which serve to distinguish *Sequoia* from *Athrotaxis*. Ann. Botany 36: 385-391. 5 fig. 1922.—A careful study of the differences between *Athrotaxis* and *Sequoia* was begun as a result of the discovery that material from the Lower Headon Beds at Hordle, England, which had been referred to *Athrotaxis* by Gardner, was really *Sequoia*. The differences between the 2 genera in leaves, cone-scales, and seeds are described, and it is stated that in all these structures the fossil agrees with *Sequoia*.—W. P. Thompson.

1210. COCKERELL, T. D. A. A new genus of fossil Liliaceae. Bull. Torrey Bot. Club 49: 211-213. Fig. 1. 1922.—The fossil material from Florissant, Colorado, which has passed as *Tmesipteris Alleni* (Lesq.) Hollick and which was referred to *Carpolithes* in 1913 by Cockerell, is now referred to *Brachyruscus* gen. nov.—P. A. Munz.

1211. DACHNOWSKI, ALFRED P. The correlation of time units and climatic changes in peat deposits of the United States and Europe. Proc. Nation. Acad. Sci. [U. S. A.] 8: 225-231. 1922.—Successive layers of different kinds of peat ("forest, fibrous sedge and reed, and colloidal") in postglacial deposits, both in the U. S. A. and in Europe, indicate the succession of different types of vegetation and therefore of different climatic conditions. The evidence from peat deposits combines with other geological evidence to indicate that well-marked stages, during and since the last Ice Age, were nearly simultaneous in northern America and northern Europe. From the combined evidence much may be inferred as to the chronology of these climatic and vegetational changes and of the stages of human culture associated therewith in Europe. A northward trend of civilization and agriculture seems to have continued for the last 60 centuries. Utilization of American peat lands should be facilitated by study of related European deposits.—Howard B. Frost.

1212. FRITEL, P. H. Contributions à l'étude du genre *Nipadites* Bowerbank et sur sa distribution géographique et stratigraphique. [Study of the genus *Nipadites* and its geographic and stratigraphic distribution.] Bull. Soc. Geol. France 21: 317-321. Pl. 16. 1922.—The author refers the genera *Castellinia* Massalongo 1852, *Fracastoria* Massalongo 1858, and *Palaeokeura* Massalongo 1854, described originally as many species of fossil fruits coming from the middle Eocene of Italy, to the palm genus *Nipadites*, and discusses the geographic and geologic range of this littoral genus.—E. W. Berry.

1213. HEMMER, A. Die fossile Flora des Oberen Ottweiler Schichten des Saarbeckens. [The fossil flora of the upper Ottweiler beds of the Saar basin.] Geog. Jahreshefte 1918/1919: 263-298. Pl. 6-10. 1920.—The author describes or comments on fossil plants found in the upper Ottweiler or Breitenbacher beds of the Saar basin. These comprise the uppermost Carboniferous of the basin and are probably of late Stephanian age. The genera mentioned and the number of species of each are as follows: 25 *Pecopteris* (1 new), 11 *Sphenopteris* (1 new), 2 *Diplotmema*, 3 *Odontopteris*, 7 *Alethopteris* (2 new), 2 *Callipteridium*, 1 *Callipteris*, 1 *Neuropteris*, 1 *Linopteris* (new), 1 *Aphlebia*, 5 *Sphenophyllum*, 2 *Calamites* (1 new), 2 *Annularia* (1 new), 3 *Asterophyllites*, 2 *Palaeostachya*, 1 *Macrostachya*, 1 *Equisetites*, 3 *Lepidostrobus*, 1 *Lepidophyllum*, 1 *Lepidophloios*, 3 *Sigillaria*, 1 *Sigillaristrobus*, 1 *Stigmara*, 1 *Pterophyllum*, 1 *Rhabdocarpus*, 1 *Trigonocarpus*, and 1 *Samaropsis*.—E. W. Berry.

1214. HOWE, MARSHALL A., and ARTHUR HOLLICK. A new American fossil hepatic. Bull. Torrey Bot. Club 49: 207-209. Fig. 1. 1922.—*Jungermanniopsis* gen. nov. and *J. Cockerellii* sp. nov. are published for a specimen from Miocene shale of Florissant, Colorado.—P. A. Munz.

1215. McLEAN, R. C. On the fossil genus *Sporocarpion*. Ann. Botany 36: 71-90. Pl. 8-10. 1922.—The author discusses the genus *Sporocarpion*, first described by Williamson, and elaborates and extends the evidence advanced in a paper published in 1912 for considering these remains to represent not plants, but a group of extinct radiolarian Protozoa, which became specialized for inhabiting the organically charged fresh and brackish waters of the Carboniferous lagoons.—E. W. Berry.

1216. RUEDEMANN, RUDOLPH. New forms of life from the Silurian. Proc. Nation. Acad. Sci. [U. S. A.] 8: 55-56. 1922.—Fossils recently obtained from the Bertie waterlime and the Lockport limestone of New York include the following: algae with air bladders, primitive land plants, and graptolites (*Dictyonema* and *Inocaulis*).—Howard B. Frost.

1217. SEWARD, A. C. On a collection of Carboniferous plants from Peru. *Quart. Jour. Geol. Soc. London* 78: 278-283. *Pl. 13, 1 fig.* 1922.—The author describes the following indefinite remains from Paracas, Peru, and suggests that they are lower Carboniferous in age *Sphenopteris* sp., *Lepidodendron* sp., *Sigillaria* or *Lepidodendron*, and *Bothrodendron* sp.—E. W. Berry.

1218. SEWARD, A. C., AND R. E. HOLTUM. Jurassic plants from Ceylon. *Quart. Jour. Geol. Soc. London* 78: 271-277. *Pl. 12.* 1922.—The paper records the following well known species from the lower Oolite (Jurassic) of Ceylon: *Cladophlebis reversa*, *C. denticulata*, *Taeniopteris spatulata*, *Araucarites cutchensis*, *Brachyphyllum mamillare*, *Elatocladus plana*, and *Desmophyllum* sp.—E. W. Berry.

1219. YABE, H. Notes on some Mesozoic plants from Japan, Korea and China, in the collection of the Institute of Geology and Paleontology of the Tôhoku Imperial University. *Sci. Rept. Tôhoku Imp. Univ.* 7: 1-28. *Pl. 1-4.* 1922.—The author describes the Permian forms. *Annulariopsis inopinata* Zeiller and *Sphenophyllum sincoreanum* n. sp. from beds in Korea regarded as lower Triassic in age, and the following forms from Mesozoic beds in China, Japan, and Korea: *Ruffordia goepperti*, *Cladophlebis browniana*, *C. geyleyana*, *C. lobifolia*, *C. denticulata*, *C. distans*, *C. nebbensis*, *C. argutula*, *C. haiburnensis*, *Pterophyllum inconstans*, *Clathropteris* c. f. *meniscoides*, *Zamiophyllum buchianum*, *Ctenis* (?) sp., *Ginkgo sibirica*, *Baiera* (?) *concinna*, *Phoenicopsis angustifolia media*, *Frenelopsis* c. f. *hohenneggeri*, and *Elatocladus manchuricus*.—E. W. Berry.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 939, 949, 972, 990, 998, 1014, 1015, 1025, 1028, 1031, 1032, 1033, 1042, 1079, 1081, 1085, 1112, 1124, 1136, 1137, 1138, 1142, 1143, 1144, 1146, 1153, 1154, 1156, 1158, 1162, 1165, 1167, 1168, 1180, 1185, 1188, 1192, 1193, 1197, 1198, 1393, 1403, 1406, 1419, 1422, 1492, 1496, 1499, 1503, 1504, 1525)

DISEASES CAUSED BY FUNGI

1220. ANONYMOUS. "Damping off" and "foot rot" of the tomato. *Exp. and Res. Sta. Nursery and Market Gard. Industries,—Development Soc., Ltd., Turner's Hill, Cheshunt, Herts Ann. Rept.* 7: 38-39. 1921.—A number of organisms are responsible, particularly *Phytophthora cryptogea* and *P. parasitica*. The disease organisms are transmitted through the soil, water, pots, and seed boxes. In addition to mentioning the heat and formaldehyde methods of soil sterilization, the author describes a preparation, Cheshunt Compound, which can be applied to the soil while the plants are growing. It controls the disease without injury to the plants. This preparation consists of finely powdered copper sulphate (2 ounces) and ammonium carbonate (11 ounces) mixed and stored in a sealed glass or stone jar 24 hours or longer. One ounce is then dissolved in a little hot water and water added to make 2 gallons. Promising results have also been obtained with this solution in the control of *Verticillium albo-atrum*, *Fusarium* sp., and *Rhizoctonia*.—W. H. Tisdale.

1221. ANONYMOUS. Leaf spot or anthracnose of cucumber. *Exp. and Res. Sta. Nursery and Market Gard. Industries,—Development Soc., Ltd., Turners' Hill, Cheshunt, Herts Ann. Rept.* 7: 32-38. 1921.—The life history of the causal organism, *Colletotrichum oligochaetum*, which attacks all parts of the host plant, is given, and the disease and the factors influencing its development under greenhouse conditions are described. Control measures include sanitation, disinfection, and cultural methods.—W. H. Tisdale.

1222. ANONYMOUS. New York observations on take-all. [Rev. of: KIRBY, R. S. The take-all disease of cereals and grasses. *Phytopathology* 12: 66-68. 1922 (see Bot. Absts. 11, Entry 4364).] *Agric. Gaz. New South Wales* 33: 566. 1922.

1223. AJREKAR, S. L., AND D. V. BAL. Observations on the wilt disease of cotton in the Central Provinces. *Agric. Jour. India* 16: 598-617. *Pl.* 33-34. 1921.—Two strains of a species of *Fusarium* were isolated from wilted cotton plants and their causal connection with the wilt disease established by inoculation experiments. Besides the usual *Cephalosporium* and *Fusarium* type of spores and chlamydospores, these 2 strains produce on culture media sclerotium- or perithecium-like bodies which differ in color. The reputed immunity of buri cotton was tested and confirmed. An attempt to ascertain whether the wilting of the cotton plant was due to any toxins secreted by the fungus gave negative results. The feasibility of different suggested methods of controlling the disease in the field is discussed in the light of the observations recorded.—A. Howard.

1224. BELGRAVE, W. N. C. Notes in the "South American leaf disease" of rubber. *Agric. Bull. Federated Malay States* 9: 179-183. 1921.—A review is given of published data on the disease of rubber attributed to *Fusicladium macrosporium* (Syn., *Passalora Heveae* and *Melanopsammopsis Ulei*), which attacks *Hevea brasiliensis*, *H. confusa* and *H. guyanensis*. A brief account of the author's observations and of the present position of the disease is appended.—I. H. Burkill.

1225. BARNUM, CLYDE C. Stem end rot of apples. *Science* 55: 707-708. 1922.—Apples have been found with decayed spots at and near the base of the stems. The fruit becomes covered with green spores, which were also found on the stems of fruit in cold storage. Cultures proved the mold to be *Penicillium expansum* Link., which ordinarily is thought to enter only through abrasions.—Inoculation experiments proved that this mold infects healthy apples and produces the same type of decay as was first found. The writer observes that such rot is rather common in California.—C. J. Lyon.

1226. BLAIR, R. J. Chemical woodpulp is attacked by molds. *Quebec Soc. Protection Plants Ann. Rept.* 14: 39-41. *Fig.* 1-3. 1922.—Small discolored spots are found in the sheets of chemical pulp, and if the discoloration spreads the product is worthless.—B. T. Dickson.

1227. BROWN, J. G. Cytospora canker, a disease destructive to cottonwoods and poplars. *Arizona Agric. Exp. Sta. Timely Hints for Farmers* 138. 4 p. 2 fig. 1922.—Of the Arizona cottonwoods and poplars, *Populus nigra* var. *italica* and *P. Fremontii* var. *Wislizeni* are least susceptible to attack by *Cytospora chrysosperma*. *Populus alba* var. *nivea* and *P. deltoides* are very susceptible. The canker also occurs on *P. MacDougalii*, *P. angustifolia*, *P. tremuloides*, *P. grandidentata*, and other species and varieties. Symptoms of the disease are given. Control measures advocated are selection of resistant varieties, good care, and pruning of diseased parts.—Herbert C. Hanson.

1228. BRUNER, STEPHEN C. Sobre la transmisión de la enfermedad del "mosaico" o "rayas amarillas" en la caña de azúcar. [Transmission of sugar cane "mosaic."] *Rev. Agric. Com. y Trab. [Cuba]* 5¹: 11-22. *Fig.* 1-5. 1922.—The studies of E. G. Smyth and of E. W. Brandes proving that the disease is transmitted by insects are discussed, and experiments to determine the possible role of the following insects in the transmission of the disease are recorded: *Kolla herbida* Walk. (*Tettigonia similis* Walk.), *Tettigonia* sp., *Draculacephala mollipes* Say., *D. reticulata* Sign., *Myndus crudus* Van D., *Stenocranus* (Delfax) *Saccharivorus* Westw., *Phaciocephalus* sp., *Oliarus* sp., *Monecphora bicincta* Say., *Pseudococcus calceolariae* Mask., *Pseudococcus sacchari* Ckl., *Aphis maydis* Fitch., *Sipha maydis* Pass., *Thrips*, *Tarsonemus spinipes* Hirst., *Paratetranychus viridis* Banks., *Euscelis bicolor* Van D., *Liburnia* sp., and *Aphis setariae*. Positive transmission of the disease was attributed only to *Aphis maydis* Fitch, in which case, however, only a low percentage of infections was obtained. Artificial

inoculation and transmission of the disease were effected by mechanical means, the disease appearing in 18 days. Various methods of artificial inoculation are discussed. Literature is cited.—G. R. Hoerner.

1229. BURLISON, W. L., AND R. W. STARK. Treating oats for smut. Illinois Agric. Exp. Sta. Circ. 240. 4 p. 1920.—Results are reported on the yield of oats (*Avena sativa*) and the percentage of smut (*Ustilago Avena*) present where seed was treated with varying quantities of formalin solution. During this experiment, which was conducted for 5 years, 1 pint of 40 per cent formaldehyde mixed with 10 gallons of water and used at the rate of 1 pint of solution per bushel of oats, gave satisfactory results.—O. H. Sears.

1230. DASTUR, J. F. Die-back of chillies (*Capsicum* spp.) in Bihar. Mem. Dept. Agric. India Bot. Ser. 11: 129-144. 2 pl. 1921.—The most serious disease of chillies (*Capsicum annuum* and *C. frutescens*) in Bihar is the die-back disease, which does considerable damage in September and October in years of continuous rain or high humidity. It spreads rapidly from field to field and in severe cases the plants are either completely killed or so badly affected that the yield is negligible. Cold weather checks the disease, the plants recovering and putting out healthy new growth. The disease is caused by a fungus, *Vermicularia Capsici* Syd., which infects the growing point or the flower bud most readily if the humidity is above 85. Control measures carried out in 1917 show that Burgundy mixture is useful in checking the disease.—A. Howard.

1231. DOIDGE, E. M. Wart disease of potatoes: *Synchytrium endobioticum*. Perc. Jour. Dept. Agric. Union South Africa 4: 447-451. Pl. 1-3. 1922.—The author describes this disease, which has been discovered for the 1st time in South Africa in the Impendhle Division, Natal. No substance experimentally applied to the soil has proved a remedy for wart. It is carried from place to place by infected seed and is spread locally by lack of care in the use of tools and chiefly by feeding diseased material to animals. Since 1919, 11 early varieties, 21 2nd early, and 31 main crop varieties have been confirmed as immune to the disease and by order of the Agricultural Board only these may be planted in infected areas in England.—L. Goldblatt.

1232. DOWSON, W. J. On the symptoms of wilting of Michaelmas daisies produced by a toxin secreted by a *Cephalosporium*. Trans. British Mycol. Soc. 7: 283-286. 1922.—The outward symptoms of the common wilt disease of Michaelmas daisies are, first a mottling of the leaves with pale patches, then a paling of the entire leaf, and finally a yellowing, shriveling, and drying of the leaf. The experiments described in this paper indicate that the mottling is due to a toxin secreted by the fungus, which causes the chloroplasts to migrate toward the ends of the palisade cells and gradually to disintegrate. The final bright yellow color of the leaves is due to the yellow masses of disintegrated chloroplasts in the ends of the palisade cells.—W. B. McDougall.

1233. DUFRENOY, JEAN. The occurrence of *Cronartium ribicola* in Europe. Phytopathology 12: 302-304. 1922.—*Cronartium ribicola* occurs to some extent all over Europe north of the Alps. Though frequently found in France, it is not generally considered a menace in the government forests where proper sanitation is practiced.—B. B. Higgins.

1234. EASTHAM, J. W. Black currant rust. Ann. Rept. British Columbia Fruit Growers Assoc. 32: 42-43. 1921.—A brief discussion is given of the economic importance of the discovery of *Cronartium ribicola* in the province and of the fruit growers' interests and responsibilities in the situation.—J. W. Eastham.

1235. EASTHAM, J. W. White-pine blister-rust in B. C. Agric. Journ. British Columbia 7: 29, 41, 57, 64. 1922.—This is a popular article dealing with the probable consequences of the extensive discovery of blister rust on cultivated *Ribes* in the Coast region of British Colum-

bia in the fall of 1921. Attention is drawn to the quarantine placed on this area, and the reasons for it are discussed.—*J. W. Eastham.*

1236. ELLIOTT, JOHN A. The *Ascochyta* blight of cotton. [Abstract.] *Phytopathology* 12: 250. 1922.

1237. FOËX, ETIENNE. Le *Schizophyllum commune stipité*. [Stiped *Schizophyllum commune*.] *Bull. Soc. Path. Vég. France* 9: 151-152. *Pl. 1.* 1922.—*Schizophyllum commune*, growing at first on acorns or chestnuts buried several centimeters under ground, forms a stipe which elongates so that the sporiferous receptacle may reach the light. However, the stipe which has thus begun to form on the buried acorn continues to elongate even after the acorn has been dug up and the fungus in consequence is exposed to the light.—*J. Dufrenoy.*

1238. HUNGERFORD, CHAS. W. The relation of soil moisture and soil temperature to bunt infection in wheat. *Phytopathology* 12: 337-352. *Fig. 1-5.* 1922.—For some years it has been known that in the Palouse region of Idaho and Washington spores of *Tilletia Tritici* (Bjerk.) Wint., blown from threshing machines, infect the fallow soil and the succeeding crop of wheat. Recent investigations have shown that such soil infestation also occurs in other wheat-growing regions of the Pacific Coast. Field observations and field and greenhouse experiments have shown that soil temperature and soil moisture at the time of seeding are important factors in seedling infection. Under controlled conditions in the greenhouse the highest percentage infection was obtained at temperatures of 9-12°C., and in soil containing 22 per cent moisture with a moisture equivalent of 20.7. It was also observed that bunt infection in the field was much more abundant when the grain was sown just after a rain.—*B. B. Higgins.*

1239. KULKARNI, G. S. Conditions influencing the distribution of grain smut (*Sphacelotheca Sorghi*) of jowar (*Sorghum*) in India. *Agric. Jour. India* 17: 159-162. 1922.—The spores of the fungus germinate best between 20 and 23°C. Above 37°C. very few germinate and 40°C. prevents germination altogether. The seeds of jowar, on the other hand, germinate most rapidly at 36-40°C. and more slowly as the temperature falls. As infection takes place in the seedling stage, there is likely to be a direct connection between the amount of infection and the temperature at sowing time. This was confirmed by direct experiments carried out at Poona, Pusa, and in Sind.—*A. Howard.*

1240. LACHAINE, O. W. Sclerotial disease of the potato. *Quebec Soc. Protection Plants Ann. Rept.* 14: 105-109. *Fig. 1-6.* 1922.—During 1921 in Restigouche County, Province of New Brunswick, a 4-acre field of potatoes was affected to the extent of 10 per cent, and 4 others from 1 to 2 per cent, with a wilt and stalk rot due to *Sclerotinia libertiana*.—*B. T. Dickson.*

1241. LÖHNIS, M. P. Onderzoek over *Phytophthora infestans* (Mont.) de By. op de aardappelplant. [Investigation of *Phytophthora infestans* on potato.] [English summary.] *Diss. Veenman: Wageningen, Holland, 1922.*—Plants (158) from infected tubers did not show infection in the field earlier than those from healthy seed. Sixty-seven infected tubers kept sprouting at 25-27°C. gave no diseased sprouts, while 240 sound tubers grown on ground that had never been in potatoes before showed blight on the same day as plants in other fields. Infection of the sprout from a diseased tuber is not the normal method of propagation from season to season.—Tubers may show the disease before the leaves are blighted.—The stage of development has no influence on the chance of contagion through neighboring plants.—In summer the fungus can not enter the tubers through the eyes, and chances of infection through the lenticels appear to be small. Artificial infections through small injuries in the skin are easily accomplished. The usual way of entrance into the tubers is through small injuries.—Of 142 plants in a field, only 1 tuber was inoculated, but infections occurred, though no spreading through the stolons to other tubers was observed.—In determining the length of time after which infection through a wound becomes impossible, it was found that wounds in young tubers

were much sooner immune to inoculation than those of ripe tubers. A correlation was found between the state of ripeness of the cork-cambium and the length of time after which no inoculations succeeded. No correlation exists with the rate of formation of wound-cork or with a distinct stage in its formation. The wound-cork does not appear to be the only factor that protects against infection.—The method of inoculating sterile blocks of raw potatoes in test-tubes in order to determine the degree of resistance of different varieties is not reliable, because blocks showing no outside growth of mycelium may be deeply infected within. The extension in the parenchyma was equal in tubers of 28 varieties. In inoculating young tubers of 39 varieties on the cork-cambium infections succeeded. Only Bravo is apparently highly resistant. Bravo tubers are highly resistant also in the field. No difference in thickness of skin or in the rate of wound-cork formation was found among different varieties. As *Phytophthora* may grow on white bean agar with 60 per cent sucrose, no connection appears to exist between osmotic pressure of the cell-sap and the growth of the fungus.—*J. Westerdijk*.

1242. MAJOR, T. G. An *Alternaria* disease of *Polypodium*. Quebec Soc. Protection Plants Ann. Rept. 14: 59-61. 1 fig. 1922.—Concentrically-zonated, brown lesions, generally occurring at the margins of fronds, were caused by an *Alternaria* with conidia averaging $13.6 \times 40.3 \mu$ and tentatively named *Alternaria Polypodii* n. sp. The disease was experimentally produced by spraying a spore suspension of this fungus on healthy, sterilized fronds.—*B. T. Dickson*.

1243. MANNS, T. F. Report of fungus diseases for 1920. Delaware State Bd. Agric. Bull. 10. 72-77. 1921.—Apple blotch (*Phyllosticta solitaria*) was severe on some early varieties. Apple scab (*Venturia pomi*) is difficult to control but the delayed dormant spray is helpful. Apple rust (*Gymnosporangium macropus*) was severe in 1 district. Root rot of apple from fire blight was less active in 1920 than in the blight years (1915-1917). Crown gall (*Bacterium tumefaciens*) on apple caused much loss.—Many unsprayed pear orchards were defoliated with leaf blight (*Entomosporium maculatum*), and *Septoria pyricola* was common. Corn root rot was common, causing 10-15 per cent injury.—Root rot of peas caused by *Pythium deBaryanum* is noted. Many cases of "sick soil" due to parasitic fungi are mentioned. Late blight of potatoes (*Phytophthora infestans*) caused 8 per cent of rot in field and storage.—*T. F. Manns*.

1244. MANUEL, H. L. Spraying for black spot of the vine. Agric. Gaz. New South Wales 33: 585-586. 1 fig. 1922.—Two spraying devices lined with lead for use in spraying sulphuric acid solutions are described.—*L. R. Waldron*.

1245. MIÉGE, M. Observations sur quelques maladies des plantes cultivées au Maroc, en 1911. [Observations on the diseases of crop plants in Morocco.] Bull. Soc. Path. Vég. France 9: 102-108. 1922.—Wheat was heavily rusted by *Puccinia glumarum* in 1921, *Triticum aurum*, *T. turgidum*, and *T. monococcum* suffering as much as *T. vulgare*. *Phytophthora infestans* infects potatoes at any time of the year, even those which are cropped at the beginning of June. *Plasmopara viticola* spreads as the vine culture extends. The occurrence of several other fungous diseases is noted.—*J. Dufrenoy*.

1246. MITRA, MANORANJAM. Morphology and parasitism of *Acrothecium Penniseti* n. sp. (a new disease of *Pennisetum typhoideum*). Mem. Dept. Agric. India Bot. Ser. 11: 57-74. Pl. 1-4 (pl. 1, col.), 1 fig. 1921.—This new disease was found on bajra (*Pennisetum typhoideum*) a crop which takes 4th place among Indian cereals, with an area of 13,320,000 acres. The ears, leaves, and leaf sheaths are attacked, with the formation of brown spots with yellow margin. The cause of the disease is a new species of fungus (*Acrothecium Penniseti*) which infects the host by way of the stomata, or by piercing the epidermis. The mycelium is both intra- and inter-cellular and is found in all parts of the infected plant. Conidiophores arise in clusters through the stomata and spores are borne apically in fascicles of 2-5. The fungus is cultivable on most artificial media but gives the highest development on wheat broth agar, potato juice

agar, nutrient glucose agar, and on French bean agar; the reaction is between + 5 and + 10 of Fuller's scale. Conidia and brown chlamydospores are both produced in culture. The parasitism of the fungus has been proved by numerous inoculations on leaves and ears. Cross inoculations on the male inflorescence of maize were successful, but those on *Sorghum* gave negative results.—A. Howard.

1247. NOWELL, W. A root disease of cacao in Trinidad. Bull. Dept. Agric. Trinidad and Tobago. 18: 178-199. 3 pl. 1919.—The writer discusses *Rosellinia* diseases with special attention to that of the cacao due to *Rosellinia Pepo*, though another species is believed to attack cacao in certain localities. The fungus and the appearance of diseased trees are described. The fungus attacks both bark and wood and in cacao plantations the original infection may be traced to forest stumps left to decay, subsequent infection spreading from tree to tree. All infected trees should be burned and all roots destroyed; the roots of adjacent trees should be isolated by trenches and the soil aerated and limed. Sulphur is also recommended as a fungicide, but to prevent increased acidity it should be accompanied or followed by lime.—Florence A. McCormick.

1248. PUTTERILL, V. A. Pear scab in the Western Province: experiments and facts relating to its control. Union South Africa Dept. Agric. Bull. 1922: 31 p., 12 pl., 4 fig. 1922.—An account is given of certain spraying experiments to control pear scab (*Venturia pirina* Aderh.) and on its occurrence in South Africa. The experiments of 1920-1921, though negative with regard to scab control, were of value in proving the necessity of controlling primary leaf infection. Those of 1921-1922 resulted in a control of leaf infection by the use of either Bordeaux mixture or of lime sulphur. The amount of diseased fruit varied from 2 per cent in sprayed trees to 59 per cent in unsprayed trees. Six sprayings were found necessary, the 4th to 6th applications being combined with arsenate of lead for the control of codling moth. The perithecial stage was found and some observations were made on the discharge of the ascospores.—E. M. Doidge.

1249. PUTTERILL, V. A. Plant diseases in the Western Province IV. Two diseases of the loquat. Jour. Dept. Agric. Union South Africa 4: 332-337. Fig. 1-7. 1922.—A description is given of the diseased fruit and leaves of the loquat (*Eriobotrya japonica*) attacked by *Fusicladium* or scab and by *Entomosporium* blight. Suggestions are offered for the control of these diseases. A common leaf blight of quince and pear doing much damage in South Africa is caused by a similar if not identical *Entomosporium*. A winter stage of this fungus (*Fabraea maculata* Atk.) is known to occur on old fallen leaves. So far as the author knows this stage has not been found on the loquat.—L. Goldblatt.

1250. PUTTERILL, V. A. Plant diseases in the Western Provinces V. The control of pear scab or "*Fusicladium*." Jour. Dept. Agric. Union South Africa 4: 430-431. Fig. 1-2. 1922.—This disease may be kept in check by spraying with Bordeaux mixture or lime sulphur at certain times. The writer mentions the discovery last September, of the winter or perithecial stage of the fungus for the 1st time in South Africa.—L. Goldblatt.

1251. RATHBUN, ANNIE E. Root rot of pine seedlings. Phytopathology 12: 213-220. Fig. 1. 1922.—In an attempt to determine the relation of various soil inhabiting fungi to root rot of coniferous seedlings, a number of inoculations were made on 4-6 months old seedlings of *Pinus resinosa* Ait. and *P. banksiana* Lamb. with cultures of *Pythium deBaryanum* Hesse, *Corticium vagum* B. & C., *Phomopsis juniperovora* Hahn, *Rheosporangium aphanidermatus* Edson, *Fusarium* spp., and *Botrytis* spp. The fungi were grown upon rice mush. A fragment of this medium containing the fungus was placed in contact with the roots of the seedlings. After 10 days the condition of the root system of each plant was recorded. Some rot occurred on the roots of non-inoculated check plants; but it was decidedly more severe on plants inoculated with *Corticium vagum*. All of the fungi used caused some increase in the amount of root rot.—B. B. Higgins.

1252. REED, GEORGE M., AND GEORGE H. DUNGAN. Flag smut and take all. Illinois Agric. Exp. Sta. Circ. 242. 4 p., 1 fig. 1920.—The appearance and control of flag smut (*Urocystis Triticis*) are discussed. Varieties resistant to this disease are recommended. Control of take-all (*Ophiobolus graminis*) lies in selecting the less susceptible varieties for seed.—O. H. Sears.

1253. RIDLER, W. F. F. The fungus present in *Pellia epiphylla* (L.) Corda. Ann. Botany 36: 193-207. Fig. 1-8. 1922.—A fungus is described which was found to occur in the thallus cells of *Pellia epiphylla*. Infection was found in all plants examined. These were collected in England and Belgium. In some cases the fungus was found in the cells of the sporophyte, pycnidia being produced in the capsule wall, calyptra, and involucre. The fungus was isolated and grown in pure culture and identified as a species of *Phoma*. The author was not able to reinoculate with the cultured fungus as no *Pellia* without the fungus has been found. Usually the diseased host was able to grow and reproduce in a normal manner. A review of the work of various authors on Musci infected by fungal mycelia is given.—W. P. Fraser.

1254. RIVIER, A. Observations sur le *Sclerotinia libertiana* Fuck. [On *S. libertiana*.] Bull. Soc. Path. Vég. France 9: 134-137. 1922.—Sclerotia of *Sclerotinia libertiana* were found on shoots of *Pyrethrum cineraraefolium* growing in wet ground near lettuce and cantaloupes. The fungus was successfully inoculated from diseased lettuce and cantaloupes to *Pyrethrum*, which had not been reported hitherto as host to this fungus.—J. Dufrenoy.

1255. ROBERTS, J. W. Apple scab and other diseases. Rept. Maryland Agric. Soc. 6: 168-175. 1921 [1922].—The control of apple scab in Maryland can be accomplished largely by proper sanitary measures in plowing under the fallen leaves. The Winesap, Stayman, and Delicious varieties are rather susceptible to scab whereas York Imperial is nearly immune. Peach leaf curl, pear spot, and cherry leaf spot have caused severe damage in Maryland, but can be controlled by proper spraying.—A. Lee Schrader.

1256. RORER, JAMES BIRCH. The fungous diseases of the avocado. Bull. Dept. Agric. Trinidad and Tobago 18: 132-133. 2 pl. 1919.—Anthracnose is given as the only serious disease of avocado. The fungus is identical with, or very closely related to, the anthracnose of the mango (*Gloeosporium mangiferae*) described in Bull. Dept. Agric. Trinidad and Tobago 14: 164. 1915.—A description of the trouble is given and spraying with Bordeaux mixture is recommended. *Diplodia cacaovicola* causes die-back of avocados as well as of cacao and rubber. It has not been proved that the fungus is able to penetrate uninjured shoots but it is thought probable that it gains entrance into very young tissues through wounds made by the anthracnose fungus. Bordeaux mixture is recommended for this disease.—Florence A. McCormick.

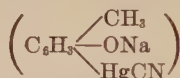
1257. RORER, JAMES BIRCH. The fungous diseases of roses and their treatment. Bull. Dept. Agric. Trinidad and Tobago 18: 29-31. 1 pl. 1919.—The following diseases are briefly described: black spot, caused by *Diplocarpon Rosae* Wolf (*Actinonema Rosae*); leaf spot, due to *Cercospora rosicola* Pass.; powdery mildew, caused by *Sphaerotheca pannosa* Lév.; red rust, due to the parasitic alga *Cephaleuros virescens*; and rose canker, caused by a species of *Stilbum*. For the first 3 troubles flowers of sulphur passing a 200-mesh sieve, and dry arsenate of lead,—1 pound to 9 of sulphur and thoroughly mixed,—are recommended. For the other 2 diseases cutting back and burning of the diseased stems is recommended and for the red rust spraying with Bordeaux is also advised.—Florence A. McCormick.

1258. RORER, JAMES BIRCH. The wither-tip of limes. Bull. Dept. Agric. Trinidad and Tobago 18: 1-3. 1 pl. 1919. [with notes added by W. G. FREEMAN].—A severe outbreak of wither-tip of limes, due to *Gloeosporium limetticolum* Clausen, is reported for July and August, 1918. The fungus attacks the tips and edges of very young leaves, the base of the stalk, or any point in the very young shoots. The first symptom is a somewhat water-soaked appearance of the attacked parts which later become brown and wither. Flowers and young fruits

are also susceptible. Infected flowers fall and diseased fruits show a rough scabby appearance and become cracked. During the dry season all dead wood and diseased leaves should be burned and as soon as the trees begin to make their new growth they should be sprayed with 4-4-50 Bordeaux mixture, to which has been added a sticker.—*Florence A. McCormick.*

1259. SANDERSON, A. R. On the parasitic habits of the plasmodium of *Physarum viride* var. *rigidum* Lister. Trans. British Mycol. Soc. 7: 299-300. 1922.—The plasmodium grows commonly in southern Malaya as a parasite on *Schizophyllum commune* on decaying logs of *Hevea brasiliensis*. Experiments showed that it can also grow as a parasite on *Hirneola hispida*.—*W. B. McDougall.*

1260. SCHAFFNIT, E. Zur Bekämpfung der Pilzkrankheiten des Getreidekorns. [Control of fungus diseases of grains.] Landw. Jahrb. 57: 259-283. 1922.—Copper sulphate and formaldehyde are commonly used for treating seed grain, especially wheat seed, for fungus spores (rust). When the concentration or time of action of these two active chemicals is not properly controlled, however, the embryos may be injured, in consequence of which the germination and growth are affected. But even if technical errors in the use of the chemicals are eliminated, the seed grain itself varies in sensitiveness due to varying degrees of ripeness of seed, injury in process of threshing, etc. A number of preparations were compared as to their disinfecting power. The most active of these were found to be Germisan



and Uspulun (a chlorphenol-mercury compound), the former being more active but having a somewhat retarding effect on seed germination. The following factors are also considered as bearing upon the causes of infection: (1) temperature of germination, (2) chemical condition of soil (lack or abundance of nutrients), (3) physical condition of soil (moisture content, soil structure), (4) change in life energy of seedlings (rapidity of growth of specific varieties, quality of seed).—*Selman A. Waksman.*

1261. SHAPOVALOV, M. *Rhizoctonia Solani* as a potato-tuber rot fungus. Phytopathology 12: 334-336. Pl. 23. 1922.—*Rhizoctonia Solani* Kühn has been found causing a jelly-like decay of the stem ends and knobs of potato tubers, principally of the Burbank and the Netted Gem varieties. In these varieties the elongated stem ends were found to be abnormal. The flesh was watery and translucent in appearance, and deficient in starch. A typical jelly-like rot was produced when such stem ends of disinfected tubers were inoculated with *Rhizoctonia*.—*B. B. Higgins.*

1262. SHARPLES, A. Treatment of mouldy rot disease by application of "agrisol." Agric. Bull. Federated Malay States 9: 184-191. 1921.—An account is given of a measure of success with this proprietary coal tar disinfectant against the mouldy rot disease of *Hevea brasiliensis*.—*I. H. Burkill.*

1263. SHAW, F. J. F. Studies in diseases of the jute plant. I. *Diplodia Corchori* Syd. Mem. Dept. Agric. India Bot. Ser. 11: 37-56. Pl. 1-11 (pl. 1, col). 1921.—The black band disease of jute (*Corchorus capsularis*) occurs towards the end of the season on the stems of the early sown crop raised for seed, and is widely diffused over the whole tract where this crop is cultivated in Bihar, Assam, and Bengal. The disease is caused by *Diplodia Corchori* Syd. which attacks the stems after flowering, the amount of infection varying greatly from season to season. The fungus is most severe on large, well-grown stems and infection takes place more readily upon green-stemmed than upon red-stemmed varieties. Further research is needed to ascertain the precise mode of infection, the limits of humidity and temperature under which infection takes place, and the reason why the late sown crop is resistant. Direct remedial measures are considered to be scarcely possible. The effective control of the disease must be

sought by means of increased knowledge of the factors involved in the growth of the host and the parasite. The fiber crop is generally free from the fungus.—A. Howard.

1264. SHERBAKOFF, C. D. *Fusaria* of corn. [Abstract.] *Phytopathology* 12: 251. 1922.

1265. SNAPP, OLIVER I. Dusting vs. spraying for the control of the curculio, brown rot and scab of peaches. [Abstract.] *Phytopathology* 12: 250-251. 1922.

1266. SPAULDING, PERLEY. Viability of telia of *Cronartium ribicola* in early winter. *Phytopathology* 12: 221-224. 1922.—Germination tests were made with teliospores of *C. ribicola* from leaves of *Ribes nigrum*, *R. odoratum*, *R. americanum*, *R. rotundifolium*, and *R. cynosbati*. The tests were made at Bethel, Vermont, beginning Sept. 26 and continuing until Dec. 8. Vigorous, living leaves bearing telia were collected from various localities. The viability of the spores was tested by placing the leaves bearing them in moist chambers and then, after a time, estimating the percentage germinated. Other telia-bearing leaves, both living and dead, were collected at various times during the period of the tests. Teliospores on leaves of *R. nigrum* germinated vigorously at the last test, Dec. 8. Strong germination was also obtained with spores on the leaves of *R. americanum* and *R. cynosbati*. On leaves of *R. cynosbati* which had fallen on the snow, teliospores had germinated Dec. 3. The results indicate that infection of pines may continue indefinitely into the winter under New England conditions.—B. B. Higgins.

1267. STOUTAMIRE, RALPH. Cause of melanose and kindred disease, stem-end rot. *Florida Grower* 26¹⁴: 6. 5 fig. 1922.—Melanose (*Phomopsis Citri*) on citrus is widely distributed throughout Florida. Bordeaux mixture (3-3-50) is probably the best spray. A new spray mixture, Bordeaux oil, has given splendid results; it seems to serve the double purpose of preventing melanose and stem-end rot, and scab.—J. C. Th. Uphof.

1268. TAUBENHAUS, J. J. Recent studies of Texas root rot of cotton. [Abstract.] *Phytopathology* 12: 250. 1922.

1269. TAYLOR, MINNIE W. Potential sporidia production per unit in *Cronartium ribicola*. *Phytopathology* 12: 298-300. Fig. 1. 1922.—The telial columns were counted on 68 leaves from the following species of *Ribes*: *R. americanum*, *R. cynosbati*, *R. glandulosum*, *R. lacustre*, *R. nigrum*, *R. odoratum*, *R. oxycanthoides*, *R. rotundifolium*, *R. setosum*, *R. triste*, and *R. vulgare*. The number of teliospores per column were then estimated and the number multiplied by the number of columns per leaf. Four times this product gave the maximum number of sporidia that could be produced per leaf. The comparisons were made on the basis of the potential sporidia per unit of leaf area. These comparisons indicate that the cultivated *R. nigrum* is by far the most dangerous neighbor to the pine trees.—B. B. Higgins.

1270. TOCHINAI, YOSHIHIKO. Studies on the physiology of *Fusarium* Lini. *Trans. Sapporo Nat. Hist. Soc.* 8: [14-19.] 1921.—*Fusarium* wilt of flax was first discovered in Japan by K. Miyabe in 1892. The disease is an important problem in Japan and in America. In Europe the centuries-old practice of crop rotation has reduced its ravages.—The fungus develops well and produces conidia on a variety of artificial media, and chlamydospores are formed in old cultures. In the synthetic medium used (ammonium nitrate, 10 gm.; potassium bisulphate, 5 gm.; magnesium sulphate crystals 2.5 gm.; cane sugar, 50 gm.; iron chloride, a trace; distilled water, 1000 cc.) tannic acid and citric acid retarded growth. In potato agar medium a low concentration of citric acid stimulated, while a high percentage retarded growth. In the synthetic solution the minimum, optimum, and maximum temperatures for growth are, respectively, 10-12, 30, and 36-37°C. Conidia do not germinate after 2 hours wet heat at 50°C. Wet heat of 60°C. does not kill the chlamydospores within 3 hours. The vitality of the fungus is not injured by -21°C.—Frederick V. Rand.

1271. VINCENS, F. *Maladies des jeunes plants et champignons microscopiques nouveaux observés sur Cinchona en Indochine.* [Seedling diseases and microscopic fungi on *Cinchona* in Indochina.] Bull. Soc. Path. Vég. France 9: 125-133. Fig. 1-4. 1922.—*Cinchona succirubra*, *C. ledgeriana*, and the hybrid *C. succirubra* × *C. ledgeriana* were diseased in nurseries at Honba, 4,500 feet above the sea in a very misty region of Indochina. The leaves of seedlings, chiefly those of *C. ledgeriana*, were spotted and fell early. Three species of *Phyllosticta* (*P. honbaensis* n. sp., *P. cinchonaecola* n. sp., and *P. Yersini* n. sp.), *Phlyctaena Cinchonae* n. sp., and *Phoma Cinchonae* n. sp. were found on fallen leaves, and are described. *Dendrophoma Cinchonae* n. sp., *Physalospora Cinchonae* n. sp., and *Guignardia Yersini* n. sp. occur on the cortex of diseased seedlings. Spraying with copper mixtures proved to be most dangerous to *Cinchona* seedlings, and the nursery had to be removed to a neighboring place.—J. Dufrenoy.

1272. WHITE, E. W. *Apple tree anthracnose or black-spot canker control.* Sci. Agric. 2: 186-191. Fig. 1-3. 1922.—The author recommends spraying early varieties with 3-4-40 Bordeaux mixture before the fall rains; spraying King and Jonathan in late August with 1-1½-40 Burgundy mixture, and when the fruit is picked with 3-4-40 Bordeaux mixture; and spraying late varieties with 3-4-40 Bordeaux mixture in August.—B. T. Dickson

1273. WILLAMAN, J. J., AND W. M. SANDSTROM. *Biochemistry of plant diseases III. Effect of Sclerotinia cinerea on plums.* Bot. Gaz. 73: 287-307. Fig. 1-7. 1922.—This is the 3rd paper in a series dealing with the biochemistry of the brown rot organism of stone fruits. The 1st dealt with its vitamine requirement, the 2nd with its relations to pectic compounds, and the present one with the changes which it produces in certain varieties of plums during the process of rotting. Five varieties of plums were used, 3 of which showed marked resistance to brown rot and 2 of which were very susceptible. Samples were taken (1) of half grown plums, (2) of plums just beginning to ripen, and (3) of fully ripe ones. Each sample was divided into 3 portions, one of which was analyzed immediately, another placed in a moist chamber and inoculated by injecting spores into the tissues, and the last left uninoculated in a moist chamber. The susceptible varieties showed a greater amount of sporulation on the surface of the fruits than the resistant ones; also, the juices of the former had a lower specific gravity, a lesser H-ion concentration, a higher titrable acidity, and a slightly smaller oxalic acid content. During the process of rotting the fungus causes a decrease in specific gravity, in H-ion concentration, and in titrable acid, but an increase in oxalic acid content. In addition it converts non-protein nitrogen of the host into protein nitrogen in its own vegetative parts and prevents the production of tannin as occurs in green fruits after picking.—F. A. Wolf.

DISEASES CAUSED BY BACTERIA

1274. ANONYMOUS. *Melon canker.* Exp. and Res. Sta. Nursery and Market Garden Industries'—Development Soc. Ltd.,—Turner's Hill, Cheshunt, Herts Ann. Rept. 7: 40. 1921.—A bacillus which is capable of producing this disease of melons (*Cucumis*) has been isolated from the cankers which appear on the plants at the ground line about the time the first fruits are set. Control measures consist of dusting diseased parts and adjacent soil with 2 parts by weight of powdered copper sulphate, 2 parts flowers of sulphur, and 10 parts dry slaked lime. Watering with Cheshunt Compound is also beneficial.—W. H. Tisdale

1275. ANONYMOUS. *Soft rot of the Arum.* Exp. and Res. Sta. Nursery and Market Garden Industries'—Development Soc. Ltd.,—Turner's Hill, Cheshunt, Herts Ann. Rept., 7: 39-40. 1921.—The Arum or Calla Lily (*Richardia*) is subject to a severe disease which at one time threatened to exterminate the crop. The disease is of a bacterial nature and is chiefly the result of a soft rot-producing organism, *Bacillus aroideae*. The disease is controlled satisfactorily by removing the diseased tissues from the corms, washing them thoroughly and steeping in 2 per cent formaldehyde for 4 hours. Clean soil and clean water should be used.—W. H. Tisdale.

1276. BROWN, D. D. Treatment of tobacco seed against wildfire and angular spot in southern Rhodesia. Rhodesia Agric. Jour. 19: 205-208. 1922.—The treatment of tobacco seed with a solution made up of 29.5 cc. of 40 per cent formaldehyde and 473 cc. of water is found to minimize the damage done to the tobacco crop by wildfire and angular spot caused respectively by *Bacterium tabacum* and *Bacterium angulatum*.—L. J. Goldblatt.

1277. DUFRÉNOY, J. Tumeurs de Sequoia sempervirens. [Tumors of Sequoia sempervirens.] Bull. Soc. Path. Vég. France 9: 148-150. Fig. 1-3. 1922.—Tumors may develop on wounded twigs, probably through infection. Transverse sections show polystelic structure, several vascular strands being imbedded in the hyperplased cortex-parenchyma, many cells of which are giant, multinuclear cells. Bacteria were observed in the parenchymatous cells.—J. Dufrénoy.

1278. EATON, B. J. Chemical notes. Malay. Agric. Jour. 10: 18-19. 1922.—Pink spot caused by *Bacillus prodigiosus* appears on the scrap rubber from *Hevea brasiliensis* on the day after it is brought into the factory.—I. H. Burkill.

1279. FROMME, F. D., AND S. A. WINGARD. Blackfire and wildfire of tobacco and their control. Virginia Agric. Exp. Sta. Bull. 228. 19 p., 2 pl. (col.), 9 fig. 1922.—This is a non-technical presentation of data covering 5 years' research which is recorded in detail in Virginia Agric. Exp. Sta. Tech. Bull. 25. Blackfire (*Bacterium angulatum*), which is also known as angular-leafspot, is more prevalent in Virginia than wildfire (*Bacterium tabacum*); the former was found in 85 per cent of fields in 1920 and the latter in 17 per cent. Reduction in yield caused by the 2 diseases during this year is estimated at 22 million pounds of tobacco. Both diseases occur on the leaves of seedlings in the plant bed as well as on leaves and flower parts of plants in the field, and field losses are determined in a large degree by prevalence of infection in the plant bed. Production of disease-free seedlings is considered the most important factor in control. This may be effected by selection of disease-free seed, disinfection of seed in mercuric chloride solution, disinfection of plant bed cloth or the use of new cloth, isolation of the plant bed and avoidance of disease-bearing material such as tobacco refuse or manure containing it. Satisfactory results have been obtained by a majority of the farmers who have practiced these measures. They should be supplemented by field sanitation, fall plowing of land when tobacco is grown in successive years, or rotation and avoidance of disease-bearing material and transfer of infection from field to field in working the crop.—F. D. Fromme.

1280. GARDNER, MAX W., AND JAMES B. KENDRICK. Tomato bacterial spot and seed disinfection. Indiana [Purdue] Agric. Exp. Sta. Bull. 251: 15 p., 10 fig. 1921.—The chief economic importance of this disease is due to the blackened scab-like spots on the fruit which are very objectionable to canners and market gardeners. No varieties have proved resistant. The bacteria which cause this disease (described elsewhere as *Bacterium exitiosum*, and by Miss E. M. Doidge as *Bacterium vesicatorium*) infect the leaves through the stomata. These bacteria are very resistant to drying, live over winter on the surface of the seed, and cause cotyledon infection at the time of germination. The disease is controlled by seed disinfection in mercuric chloride, 1:3000, for 5 minutes.—Max W. Gardner.

1281. HEDGES, FLORENCE. Bacterial pustule of soy bean. Science 56: 111-112. 1922.—This disease is much like that produced by *Bacterium glycineum* Coerper but differs in early stages. The organism has been named *Bacterium Phaseoli* var. *sojense* n. var. It occurs south of Washington. D. C.—C. J. Lyon.

1282. KILLIAN. Zur Anatomie des Kartoffelschorfes. [On the anatomy of potato scab.] Landw. Jahrb. 54: 267-276. Fig. 58-69. 1919.—The production of superficial and deep scab pustules or their various modifications seems to depend on the ability of the organ to develop protective layers which will exclude the pathogen. The cause for this different behavior of the cells of the infected tuber appears to be vested in the parasite. It is well known that the different Actinomycetes vary in sensitivity to the chemical reaction of the culture media.

It is also evident that the pathological metabolism of infected cells may cause the production of substances which reduce the vitality of the pathogen and permit the formation of protective periderm layers on the part of the host. A slow host response results in the formation of deep scab pustules, while a quick reaction permits only a superficial penetration by the parasite and the consequent development of superficial scab.—*Ernst Artschwager*.

1283. MACINNIS, JEAN. The origin of so-called "mildew" injury to paper-maker's felt. *Paper Trade Jour.* 74¹⁴: 41-42. *Fig. 1-3.* 1922.—No true "mildew" was found but injury to felts was caused by a bacterium close to *Bacillus mesentericus*. The bacteria form spores resistant to drying and high temperatures. The spores are nearly always present in felts and result in injury when moisture and temperature are favorable. Felts stored in a dry place at moderate temperatures are not damaged.—*H. N. Lee*.

1284. McLARTY, H. R. Fire blight. *Ann. Rept. British Columbia Fruit Growers Assoc.* 32: 47-50. 1921.—This is a popular address on the nature and control of fire-blight.—*J. W. Eastham*.

1285. MIÈGE, M. Sur une maladie de la pomme de terre observée au Maroc. A disease of the Irish potato in Morocco.] *Bull. Soc. Path. Vég. France* 9: 109-112. 1922.—The leaflets of potato, blackened toward their tips, later become detached and fall. Black dots appear scattered over the tubers and finally the diseased parts become liquefied and exude a clear liquid. A bacterium, isolated from diseased stalks, has been cultivated in pure culture. The disease appears to be of bacterial nature but preliminary inoculation tests gave conflicting results, possibly due to the presence of numerous aphids on the experimental plants.—*J. Dufrénoy*.

1286. SMITH, ERWIN F. Fasciation and prolepsis due to crown gall. *Phytopathology* 12: 265-270. *Pl. 16-20.* 1922.—A detailed account is given of the development of a fasciated shoot from a previously dormant bud of *Tropaeolum majus* L. after inoculation with *Bacterium tumefaciens* Sm. & T. No tumor tissue was evident on the surface of the fasciated shoot; but when sectioned and stained, proliferated tumor tissue was found in the interior of its base. The rest of the shoot was free from bacterial invasion. These results together with the study of other artificially produced fasciations have led to the suggestion that fasciations in general are due to some disturbance in the embryonic tissue of the growing point pushing apart the elements which develop into more or less separated axes of growth. Therefore, in studying individual cases of fasciation, the parasite or cause of the deformity should be sought at the base of the abnormal portion. In a discussion of prolepsis induced by the development of crown gall tumors the similarity to conditions found in certain plant diseases of obscure origin, such as peach "yellows," is pointed out.—*B. B. Higgins*.

1287. SMITH, CLAYTON O. Pathogenicity of the olive knot organism on hosts related to the olive. *Phytopathology* 12: 271-278. *Pl. 21-22.* 1922.—In order to obtain more definite data on the host range of *Pseudomonas savastanoi* E. F. S., inoculations were made on olive (*Olea europea* L.), *Frazinus velutina* Torr., *F. floribunda*, *Adelia acuminata* Michx., *Ligustrum ovalifolium* Hassk., *Chionanthus virginica* L., *Osmanthus fragrans* Lour., *O. aquifolium* Sieb., *Thevetia nereifolia* Juss., *Nerium oleander* L., *Coprosma Baueri* Endl., *Carissa grandiflora* DC., *Chrysanthemum frutescens* L., *Elacagnus angustifolia* L., *Vinca*, lilac, jasmine (probably *Jasminum primulinum* Hensl.) and on several species of *Prunus*. Definite knots were produced on the olive, *Frazinus velutina*, *F. floribunda*, *Adelia acuminata*, and *Jasminum primulinum*. On *Osmanthus aquifolium* and on *Chionanthus virginica* some hypertrophied tissue developed, but it was in the form of definite cankerous lesions rather than knots similar to those produced on the olive. On all other species the results were either negative or doubtful. The infectiousness of the organism seems to be confined to plants closely related to the olive.—*B. B. Higgins*.

1288. WELLES, COLIN G. **Bacterial plant diseases in the Philippine Islands.** *Science* 56: 18. 1922.—Tobacco and other solanaceous and non-solanaceous plants are attacked by *Bacterium Solanacearum* E. F. S. "Citrus is attacked by the citrus canker organism, cabbage by *Pseudomonas campestris* (Pamm.) E. F. S., cotton by *P. Malvacearum* E. F. S., and parsley by an organism not previously described." With the exception of citrus canker, all have been introduced.—C. J. Lyon.

1289. WELLES, COLIN G. **Identification of bacteria pathogenic to plants previously reported from the Philippine Islands.** *Philippine Jour. Sci.* 20: 279-285. 1922.—*Bacterium Solanacearum* E. F. S. on tobacco, *Pseudomonas Phaseoli* E. F. S. on *Phaseolus vulgaris*, and *Bacterium Malvacearum* E. F. S. on cotton are isolated and identified, while *Bacillus nelliae*, the causal organism of parsley wilt in the Philippines, is described as a new species. In the latter disease the bundles are packed with bacteria as in the wilt caused by *Bacterium Solanacearum*, and the whole behavior of parasitized plants is also similar. However, the author's physiological studies showed the organism to be entirely different and its description and cultural characters on various media are briefly given.—E. D. Merrill.

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

1290. KULKARNI, G. S. **The "murda" disease of chilli (Capsicum).** *Agric. Jour. India* 17: 51-54. Pl. 6-7. 1922.—The disease is caused by mites and is said to be the greatest enemy of the chilli plant in Bombay. Good results were obtained by use of lime-sulphur wash.—A. Howard.

1291. MCCLINTOCK, J. A. **The control of root-knot. A progress report.** [Abstract.] *Phytopathology* 12: 250. 1922.

1292. WATSON, J. R. **Bunch velvet beans to control root-knot.** *Florida Agric. Exp. Sta. Bull.* 163. p. 53-59, fig. 11-12. 1922.—The method of controlling nematodes has grown out of summer fallow experiments. By fallowing and not allowing a crust to form on the surface of the ground, root-knot nematodes were greatly reduced.—For use in nematode control the bunch velvet bean has 2 advantages over the running beans: it allows constant cultivation, and its growing season is shorter. It is also practically immune to nematodes, which is not true of cowpeas, though the varieties Iron, Brabham, and Victory are highly resistant. Velvet beans should be planted early, after the last spring truck crop. If possible this should take place in May, and never later than June. Truckers are advised to employ this method during summer on land infected with root-knot.—J. C. Th. Uphof.

1293. WOODWORTH, H. E. **Injury to citrus by scale insects in the Philippines.** *Philippine Agric. Rev.* 14: 435-439. 1921.—From observations made principally in the various plantations of the College of Agriculture at Los Baños, Laguna, it is stated that the degree of primary injury from scale insects is usually directly related to the condition of the plant. Scale insects are most numerous during the dry season (January-July), when they receive the minimum of natural check. Injury at this time is greatly enhanced by the poor resistance of the trees during the dry season. Fungi parasitic on scale insects are most effective from August to January and insect parasites, from July to November. The principal fungus parasites of the scale, *Coccus viridis* Green, are *Microcera coccophila* Desm., *Aschersonia sclerotoides* P. Henn., and *Septobasidium* spp. Its most important insect parasites are *Coccophagus* sp. and *Aneristis* sp.—Spraying or fumigation is a necessary supplement to these natural checks.—Frederick V. Rand.

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

1294. ANONYMOUS. **Mosaic disease.** *Exp. and Res. Sta. Nursery and Market Garden Industries'—Development Soc. Ltd.,—Turner's Hill, Cheshunt, Herts Ann. Rept.* 7: 41. 1921.—Mosaic of tomato (*Lycopersicum esculentum* Mill.) is becoming one of the most important

diseases of the crop. Symptoms of the disease are discussed, and its spread by man and insects. Little is known about the disease.—*W. H. Tisdale.*

1295. DICKSON, B. T. **Studies concerning mosaic diseases.** Macdonald Coll. Tech. Bull. 2. 103 p., 8 pl. 1922.—A list of plants suffering from mosaic disease, complete to date of writing, is given. This includes as new, mosaic of *Rubus strigosus*, *Pisum sativum*, *Trifolium hybridum*, *T. incarnatum*, and *Medicago lupulina*. One instance of mosaic of *Medicago sativa* is noted. Symptoms are given, including striping of tobacco stems, mottling of tomato fruit, and speckling of red-purple blooms of sweet pea. Modifications of symptoms due to the temperature, and to the amount and virulence of the inoculum are discussed. Mosaic causes a reduction in set of seed and in germinating power in *Vicia faba*, *Trifolium pratense*, and *Pisum sativum*. Seed inheritance of mosaic occurs in clovers and apparently in Leguminosae generally, but not in raspberry. Studies of the pathological histology in 16 mosaic diseases indicate hypoplasia in lighter green areas, reduction in intercellular spaces and chlorophyll content, and increase in number of trichomes. In darker areas there is hypertrophy,—in severe cases due to hyperplasia,—increase in intercellular space volume and in chlorophyll content, and a reduction in number of trichomes. Degenerate plastids and "feverish" movement of minute bodies in severely affected cells is noted. Theories of etiology are given. The author could not find amoeboid bodies such as described in corn, sugar-cane, and *Hippeastrum*. Minute bodies, apparently similar to those described by Ivanowski, were found in diseased *Nicotiana tabacum*. Experiments to determine the effect of colored light indicated that no remedial result occurs. Cross-inoculations were carried out among the clovers *Trifolium repens*, *T. hybridum*, *T. incarnatum*, and *Medicago lupulina*; and *Macrosiphum pisi* Kalt was found to be a carrier of the disease. The symptoms distinguishing raspberry mosaic from curl are given. A bibliography gives 153 references.—*B. T. Dickson.*

1296. DUGGAR, B. M., AND JOANNE L. KARRER. **The sizes of the infective particles in the mosaic disease of tobacco.** Ann. Missouri Bot. Gard. 8: 343-356. 1921.—Too frequently our knowledge of the infective agency causing mosaic has been chiefly the assertion "of the passage of infective particles through some bacteriological filter, * * * with no particular effort to effect a more precise standardization" of the filters "so as to permit a more definite measurement of the particles concerned." The technique of experimentation has been divided into 3 phases: "(1) filtration of diseased juice through various ultra filters, (2) inoculation of healthy plants with the filtrates obtained, and (3) the standardization of the filters by a determination of their capacity to permit or prevent the passage of colloidal particles of known, or approximately known, sizes."—Preliminary tests were carried out by inoculation with filtrates from diseased juices after they had passed through (1) a Livingston atmometer cup, (2) layers of agar, and (3) Schleicher and Shiill parchment shells. Then such ultra filters as the following were utilized and standardized for size of the particles allowed to pass: (1) the Mandler diatomaceous filter, (2) spherical and cylindrical atmometer cups, (3) atmometer cups infiltrated with $Al(OH)_3$, (4) and celloidin cups. It was found in the preliminary tests that the spherical atmometer cups and the parchment shells allowed the passage of the infective agent. A smaller number of infective particles passed through the cylindrical atmometer cup than through the spherical one used. The Mandler filter proved to be rather porous.—In order to standardize the filters as to porosity, organic sols were used. Dextrin solutions, casein in milk free of fat, haemoglobin prepared from ox blood, and gelatin solution were selected as representing a wide range of sizes of particles. The results show that the infective particles are comparable in size to particles of hemoglobin. Assuming that at most haemoglobin particles have an average diameter of $30\ \mu\mu$ and the average small diameter of bacterial plant pathogens is around $1000\ \mu\mu$, we have 30:1000 to express roughly the diameter relations of mosaic disease particles in comparison with bacterial plant pathogens.—*S. M. Zeller.*

1297. ELMER, O. H. **Mosaic cross-inoculation and insect transmission studies.** Science 56: 370-372. 1922.—The mosaic diseases of the Cucurbitaceae, Solanaceae, and Leguminaceae are found to be inter-transmissible. Inoculations were made by means of transfer of juice

and by transfer of aphids from mosaic to healthy plants. The mealy bug, *Dactylopus* sp., also proved to be a good carrier of mosaic.—*C. J. Lyon.*

1298. ESMARCH, F. Beiträge zur Anatomie der gesunden und kranken Kartoffelpflanze. I. Anatomie der vegetativen Organe. [Contribution to the anatomy of the normal and diseased potato plant.] Landw. Jahrb. 54: 161-266. Fig. 1-57. 1919.—In the study of the anatomy of "leafroll plants" carried on for a number of years under the direction of Schander, considerable data bearing on the normal anatomy of the potato plant has been accumulated; and since, notwithstanding the pioneer researches of Sorauer and de Vries, there existed many gaps in our knowledge of the potato plant, it was found desirable to publish the fruits of the investigations of the Bromberg Institute, thereby putting our knowledge of the anatomy of the potato plant on a broader and more exact scientific basis. In this work both anatomical structure and ontogenetic development of all the organs are taken into consideration, and since the structure of many of the tissues is involved numerous illustrations have been added to the text. The literature references are very complete and full credit is given to the work of earlier investigators. According to the writer, the phloem of mature plants always becomes necrotic, and consequently regards the phloem necrosis theory of leafroll as obsolete.—*Ernst Artschwager.*

1299. GARDNER, MAX W., AND JAMES B. KENDRICK. Tomato mosaic. Indiana [Purdue] Agric. Exp. Sta. Bull. 261. 24 p., 13 fig. 1922.—A brief review of the literature on tomato mosaic is followed by an account of the nature and outstanding characteristics of the disease, including illustrations of the symptoms. Attention is focused chiefly upon the mode of overwintering of the disease in the related perennial weeds *Physalis subglabrata*, *P. heterophylla*, and *Solanum carolinense*, of which illustrations are included. These weeds are very abundant in the Indiana tomato regions and mosaic occurs very commonly among the weeds wherever tomatoes have been grown. This perennial reservoir of mosaic in the weed flora is increasing annually as new fields are used for tomatoes. As a mosaic control measure the eradication of these weeds in and near greenhouses, plant beds, and tomato fields is recommended.—*Max W. Gardner.*

1300. KASAI, MIKIO. Observations and experiments on the leafroll disease of the Irish-potato in Japan. Ber. Ohara Inst. Landw. Forsch. 2: 47-77. 1921.—The author discovered the disease in Japan in 1919. So serious has it become that growers in some provinces are obliged to import all their seed. The disease, which appears to be spreading, is characterized by rolling, rigidity, and discoloration of the leaves, dwarfing of the plant, discoloration of the tuber, shortness of stolons, persistence of diseased mother tubers, and marked reduction in crop yields. It is transmitted by the seed-tubers rather than through the soil, and may be carried from plant to plant by insects and by transfers of the juices of diseased plants. A bibliography is appended.—*H. S. Reed.*

1301. LEE, H. ATHERTON, AND E. W. KOPKE. Mosaic disease of sugar cane in the Philippines. Philippine Agric. Rev. 14: 418-421. Pl. 12-1 (pl. 12 colored). 1921.—A history and description of the disease are given, together with a discussion of present knowledge regarding it, losses due to its presence, and methods of control. Careful selection of cane points or cuttings and the utilization of resistant varieties are recommended.—*E. D. Merrill.*

1302. MARRE, EUGENE. La dégénérescence de la pomme de terre. Mission d'études en Hollande. [Degeneration in potatoes.] 52 p., 1 fig. Imprimerie Carrère: Rodez. 1921.—A detailed and circumstantial account is given of a French mission to Holland undertaken at the invitation of H. M. Quanjer for a first-hand study of the degeneration diseases of potatoes and the methods of control practiced in that country.—As a result of this survey certain recommendations are drawn up for the development and maintenance of disease-free seed, including (1) a search for healthy plants among different varieties, (2) isolated culture of selected plants, (3) multiplication by culture *en masse*, and (4) multiplication of selected strains and distribution to the growers.—*Frederick V. Rand.*

1303. MATSUMOTO, TAKASHI. Some experiments with Azuki-bean mosaic. *Phytopathology* 12: 295-297. *Fig. 1-2*. 1922.—A typical mosaic disease is reported as occurring on Azuki beans (*Phaseolus radiatus* var. *aurea*) in Japan. The diseased plants are more or less dwarfed. Their leaves are mottled with dark green and lighter yellowish areas, and are often somewhat distorted. In the dark green areas the palisade cells are much longer and narrower than in the normal leaf, while in the yellowish areas the corresponding cells are abnormally short and crowded. Similar conditions are also found in the spongy parenchyma. In the dark areas also the chloroplasts are larger and more abundant than in the lighter areas; and starch is more abundant in the dark areas irrespective of the time of day. Field observations indicate that some varieties may be immune to the disease.—*B. B. Higgins*.

1304. NELSON, RAY. Transference of the bean mosaic virus by *Macrosiphum solanifolii*. *Science* 56: 342-344. 1922.—The spread of bean mosaic was observed during 1921 under conditions which strongly suggested transfer by insects. The sudden appearance of the disease in the aphid-infested water cultures of beans growing in the greenhouse indicated even more definitely the mode of dissemination. Definite proof of the transfer of the virus by *Macrosiphum solanifolii* was obtained under controlled conditions, both in the greenhouse and in the field.—*Author's summary*.

1305. OORTWIJN BOTJES, J. Het gebruik van onrijpe aardappelknollen als pootgoed. [The use of unripe potato tubers for seed.] *Cultura* 34: 173-185. 1922.—The author states that theoretically tubers from early harvested plants, which are supposedly healthy, will give a smaller proportion of diseased descendants than tubers from late harvested plants. This is due to the presence of greater numbers of leaf aphids and "cicadas" during late summer and fall, which increases the chances for infection; and to the fact that in case of infection the contagium will not have the time to spread to as large a number of tubers per plant.—A number of examples are cited which seem to prove this hypothesis. A few (1788-1810) are mentioned in which it was apparently proved that plant material from northern regions and high altitudes was free from "curl" on account of freezing of the foliage before ripening of the tubers. Hutchinson at Wye, England, showed in 1912-1913 that "leafcurl" and "blight" in potatoes were very much decreased by the use of early harvested (July-Aug.) seed tubers. The same information came from Australia and many other places. In nearly all cases the yield was greatly increased. The author shows, however, that the number of cases was too small in which accurate account was kept of the diseased condition of parents and descendants. More experiments will have to be made. The author does not claim that disease-free seed potatoes may be obtained in this manner, but he believes that the influence of the so-called "degeneration" diseases can be greatly lessened.—*Peter J. Klaphaak*.

1306. PALM, B. T. De mozaiekziekte van de tabak een chlamydozoonose? [Is the mosaic disease of tobacco a chlamydozoonose?] *Bull. Deli-proef Sta. Medan, Sumatra* 15. 10 p. 1922. [English translation by P. G. WILSON.]—High lights in the history of tobacco mosaic investigation are briefly outlined from the time of Mayer's work in 1886 down to the more recent studies of Allard, Quanjer, and others.—In the author's histological and cytological investigations use was made of Flemming's mixtures, hot sublimate-alcohol, and Zenker's fluid as fixatives, while Heidenhain's haematoxylin, eosin, and Loeffler's methylene blue were employed as stains.—Using Deli tobacco affected with mosaic, it is claimed that both stained and unstained material showed minute granules of varying size, and peculiarly shaped corpuscles which were not present in healthy tobacco. The larger foreign corpuscles lay either in intimate contact with the nucleus or in its vicinity. They were often amoebiform, less frequently round to spherical. The cell nucleus in such cells was frequently hypertrophied and often showed signs of degeneration.—These granules and corpuscles are described in some detail and compared to the so-called "chlamydozoon-strongyloplasmas" in certain human and animal diseases, such as variola, molluscum contagiosum, trachoma, and "Geflügelpocke."—It is the author's opinion that a *Strongyloplasma* species must be considered as the cause of tobacco mosaic although definite proof of such a causative connection is not yet forthcoming.

It is proposed that the organism first discovered by Ivanowski, apparently identical with the author's findings, should be called in honor of this investigator *Strongyloplasma Ivanowskii* n. sp. A more detailed exposition is reserved for a later paper.—*Frederick V. Rand.*

1307. QUANJER, H. M. Een proef over de beteekenis van ziekten en ziekteverspreiding bij de pootgoedverwisseling, genomen door het Instituut voor Phytopathologie in 1920 en 1921. [An experiment on the significance of disease and disease distribution relative to changing of seed potatoes, conducted by the Institute for Phytopathology in 1920-1921.] *Cultura* 34: 135-141. 1922.—The deterioration of potato varieties in one area more than in another is caused mainly by the increase of certain diseases. The variety Paul Krüger shows a tendency toward susceptibility to leaf-roll while the variety Eigenheimer shows a similar tendency toward mosaic. The former was tested in different sections of the Netherlands. In an experiment near Oostwold, potatoes were planted in a beet field; aphids were rare and healthy plants were in the majority. In the plot near Bennekom aphids were observed, and many plants showed signs of disease. Other similar examples are given.—In connection with these experiments various suggestions are given relative to: (1) the disease distributing insects; (2) the kind of inter-crops; and (3) the influence of soil and climate upon insects and plant diseases. These experiments are to be widely continued.—*J. C. Th. Uphof.*

1308. RANKIN, W. H., AND J. F. HOCKEY. Mosaic and leaf curl (yellows) of the cultivated red raspberry. *Phytopathology* 12: 253-264. 1922.—The symptoms of leaf curl are very characteristic and unmistakable. The mid-vein of each leaflet in all new growth develops unequal tensions which cause it to arch upward and the tip of the leaflet to curl downward. A similar tension in the lateral veins often causes the entire margin of the leaflet to roll downward. The intravascular tissue is often "puckered" or "gathered." Leaves formed previous to infection remain normal throughout the season. New canes formed the year after infection has occurred are stunted and show a distinct phloem necrosis. Fruit formed on infected plants is insipid and has very little pulp. In many respects raspberry leaf curl suggests potato leaf roll. The symptoms of mosaic are not so constant or characteristic. On plants that have been diseased 3-4 years the new canes are short and very slender and the leaves are small, yellowish, and more or less mottled. On plants more recently infected these symptoms are less marked. The fruit produced is similar to that produced on plants affected with leaf curl. Both diseases seem to be spread by an aphid (*Aphis rubiphila* Patch). In the climate of St. Catharines, Canada, the spread is rather slow, usually limited to 1-2 adjacent plants each year.—*B. B. Higgins.*

1309. ROSEN, H. R. Corn mosaic in Arkansas. [Abstract.] *Phytopathology* 12: 250. 1922.

1310. ROSEN, H. R. "Mosaic" disease of corn in Arkansas. [Abstract.] *Phytopathology* 12: 252. 1922.

1311. SIMONETTO, MOISES. Como se debe determinar con buena aproximacion el porcentaje de cañas enfermas en un cañaveral infectado con el "mosaico." [How the percentage of diseased canes should be determined with close approximation in a [sugar cane] field infected with mosaic.] *Rev. Agric. Com. y Trab. [Cuba]* 5³: 26-27. 6 fig. 1922.

1312. TICE, C. Leaf-roll disease of the Irish potato. *Agric. Jour. British Columbia* 7: 10-11. Fig. 1-2. 1922.—This popular article for the potato grower discusses the geographical distribution, symptoms, cause, transmission, and economic importance of leaf-roll.—*J. W. Eastham.*

1313. TICE, C. Mosaic disease of potatoes. *Agric. Jour. British Columbia* 7: 77, 83. 1 fig. 1922.—This is a popular article for potato growers.—*J. W. Eastham.*

PARASITIC PHANEROGAMS

1314. FISCHER, C. E. C. Host plants of *Santalum album*. Indian Forest. 48: 113. 1922.—Ten plants not usually recorded are given as hosts.—E. N. Munns.

1315. LUTHRA, JAI CHAND. *Striga* as a root parasite of sugarcane. Agric. Jour. India 16: 519-523. Pl. 24-26. 1921.—Two species of *Striga* (*S. densiflora* Benth. and *S. euphrasioides* Benth.) were found as semi-parasites on sugar cane in the low-lying areas along the River Sutlej in the District of Ludhiana. The haustoria of this parasitic phanerogam are 1-3 mm. in diameter and attached to the roots of cane in large numbers. The haustoria develop suckers which rupture the endodermis and penetrate into the vascular tissue.—A. Howard.

NON-PARASITIC DISEASES

1316. LUTMAN, B. F. The relation of the water pores and stomata of the potato leaf to the early stages and advance of tipburn. Phytopathology 12: 305-333. Fig. 1-15. 1922.—The tipburn of potato discussed in this paper is distinct from the burn produced by the potato leafhopper. It is entirely physiological in its origin, being brought about by excessive loss of water and the action of sunlight during periods of dry weather and brilliant sunshine; it is most abundant in Vermont about Aug. 10 when but few leafhoppers are present. The potato leaflets are provided with hydathodes, especially numerous near the tip, which open directly into a comparatively large vein running near the margin of the leaflet. During hot dry weather the loss of water from these hydathodes is so rapid that the conducting system of the leaf can not replace it, and the cells of the underlying tissues are plasmolized beyond recovery. This occurs most frequently at the tip of the leaflet where the hydathodes are so abundant. The subsequent advance of tipburn is due partly to plasmolysis of the cells and partly to the destructive action of intense sunlight on the chlorophyll. The severity of tipburn is reduced by spraying the plants with Bordeaux mixture, doubtless because water pores and stomata become clogged by the gelatinous colloids of the spray, with consequent reduction in transpiration.—B. B. Higgins.

DISEASES OF UNKNOWN CAUSE

1317. LEE, H. ATHERTON, COLIN G. WELLES, AND MARIANO G. MEDALLA. Fiji disease of sugar cane in the Philippines. Philippine Agric. Rev. 14: 413-417. Pl. 9-11. 1921.—This paper gives a general history and description of the disease, losses due to it, and methods of reducing those losses. Careful selection of cane points or cuttings, and the use of resistant or partly resistant varieties are recommended.—E. D. Merrill.

1318. SANDERSON, A. R., AND H. SUTCLIFFE. Brown bast. An investigation into its causes and methods of treatment. 71 p., 26 pl. (3 colored), 8 fig. Rubber Growers' Assoc.: London, 1921.—This investigational report takes up in detail the symptoms of brown bast of rubber tree, the effects of tapping, the distribution of brown bast cortex in affected trees, the incidence of burr formation, and experiments and recommendations relative to treatment.—Among the points brought out are the following: No case of brown bast has been observed in an untapped tree. If the depth of tapping has to be increased in order to obtain latex this disease may be suspected. The constant characteristic of brown bast is the abnormal presence in the latex of meristematic tissue which is almost invariably in the vicinity of latex vessels. The latex in these vessels is usually coagulated. Tapping is considered the prime cause of the disease and any tree subjected to tapping is liable to, although it does not necessarily develop, the disease. An increase in the period between tapping operations tends to reduce the number of cases. Stripping is a cure for brown bast, prevents its spread, and enables the tapping operations to be kept near the base of the tree where the richest reserve of latex is obtained.—Except in cases of deep-seated origin, starch is usually nearly or quite absent in brown bast cortex. Oil globules are frequently present and sometimes in considerable numbers. A brown substance resembling tannin is abundant, sometimes entirely filling many

of the cortex cells. The newly formed tissue arising from abnormal meristematic cells of the cortex sometimes becomes liquefied.—“The time is rapidly approaching when Brown Bast treatment will become part of the ordinary routine work of the estate.”—*Frederick V. Rand.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

1319. ANONYMOUS. Plant pathology. The Lancet 203: 85-86. 1922.—A brief discussion is given of the relationship between plant and animal pathology, especially the technique used in these fields by investigators. Closer cooperation in the 2 fields is suggested.—*W. H. Tisdale.*

1320. APPEL. Die Organisation des Pflanzenschutzes im deutschen Reich. [The organization of plant protection in Germany.] Arbeit. Deutsch. Landw. Ges. 314. 119-136. Fig. 1-2. 1921.—The author divides the growth of this work into 3 periods, the present being the 3rd. The organization of the work with main stations, substations, etc., is described in detail. There are 2 figures, in 1 of which the organization is shown as a grape vine with stem representing the “Direktion” and leaves the outlying stations or lines of work. The other figure is a map of Germany showing the locations of the stations.—*A. J. Pieters.*

1321. APPEL. Die wirtschaftliche Bedeutung der Pflanzenkrankheiten und die Mittel zu ihrer Bekämpfung. [The economic significance of plant diseases and means for their control.] Arbeit. Deutsch. Landw. Ges. 314. 101-118. 1921.—The author quotes figures to illustrate the serious economic loss due to plant diseases and insects, and the methods of combating them.—*A. J. Pieters.*

1322. BALL, E. D. Insects as disseminators of plant diseases. II. Systematic relations of carriers. Phytopathology 12: 229-231. 1922.—A survey of previous work indicates that an insect carrying the infectious entity of a plant disease over winter is very likely to be one which passes the winter in the adult stage; and that, in case of specific transmission, it is likely to be a sucking insect and to have a long adult life period.—*B. B. Higgins.*

1323. BECKER, GEO. G. Three years sweet potato certification work in Arkansas. [Abstract.] Phytopathology 12: 252. 1922.

1324. BIRD, MAURICE. Concerning yield deterioration in the older sugar countries. Internat. Sugar Jour. 24: 406-407. 1922.—As consulting chemist in British Guiana, the writer has observed that in many of the old plantations the plant food in the soil is less than is required by the growing cane. The crop is diminished and subject to insect and fungous pests, in particular to root rot (*Marasmius*). Application of artificial manure which supplied the lacking plant food not only increased the crop but freed it from *Marasmius*.—*C. Rumbold.*

1325. BISBY, G. R., E. E. CLAYTON, W. H. MARTIN, J. T. ROSA, JR., and E. A. STOKDYK. The cooperative potato spraying project: Report for 1921. Phytopathology 12: 241-248. 1922.—The report includes data from potato spraying experiments conducted by pathologists in British Columbia, Manitoba, Eastern Canada, Ohio, New Jersey, Missouri, Kansas, Pennsylvania, West Virginia, Kentucky, Indiana, and Arizona. In the states of Kansas and Missouri the value of Bordeaux mixture is questionable. Comparisons of dusting and spraying were made during 1921 in New Jersey, Ohio, and Manitoba; the results indicate the inferiority of dusting.—*B. B. Higgins.*

1326. BLAIR, R. J. The cause and prevention of decay in structural timber. Paper Trade Jour. 73²⁵: 51-53. Fig. 1-6. 1921.—A description is given of the causes of decay, especially in mill roofs, and the type of construction necessary to prevent decay.—*H. N. Lee.*

1327. BROWN, J. G. Treatment of seed potatoes for scab and black scurf. Arizona Agric. Exp. Sta. Timely Hints for Farmers 136. 4 p., 1 fig. 1922.—Popular descriptions of the mercuric chloride and formaldehyde treatments are given.—*Herbert C. Hanson.*

1328. BUCHNER, PAUL. Tier und Pflanze in intrazellulärer Symbiose. [Animal and plant in intracellular symbiosis.] 462 p. 2 pl., 103 fig. Gebrüder Borntraeger: Berlin, 1921.—This rather exhaustive, largely zoological work is divided into 7 parts dealing with (1) symbiosis of protozoa, sponges, and coelenterates with green algae and yellow algae; (2) symbiosis in worms; (3) in bryozoa, echinoderms, mollusks, and tunicates; (4) intracellular symbiosis in insects; (5) light symbiosis; (6) the errors in symbiosis investigation; and (7) concluding observations.—Of special interest to pathologists are the sections dealing with the presence of bacteria in amoebae and in *Cyclostoma elegans*, the presence of fungi (Chytridiaceae) in certain ascidians, the errors in symbiosis investigation, and general considerations relative to infection relations and the intimacy of symbiosis.—Nineteen pages are devoted to a literature list.—Frederick V. Rand.

1329. BUTLER, O., AND T. O. SMITH. On the use of acetates of copper as fungicides. Phytopathology 12: 279-289. Fig. 1. 1922.—The adhesive power and the fungicidal value of neutral and of basic copper acetate have been studied. Decomposition, which increases the adhesiveness of solutions of these salts, is much more rapid with the basic than with the neutral salt. The adhesiveness of both solutions is increased markedly by the addition of gelatin; and it should always be added, especially to the neutral solution. No measurable difference in the toxicity of the 2 was found; therefore, when obtainable, the basic salt is recommended. Either neutral or basic copper acetate might well replace cupra-ammonia as a spray, being cheaper and less injurious to foliage. Directions for preparing the sprays are given.—B. B. Higgins.

1330. CAESAR, L. Insect[s] as disseminators of plant diseases. III. Control problems. Phytopathology 12: 231-233. 1922.—The need of further study on the life history of causal organisms and of more definite knowledge as to the host relationships is emphasized. In many cases, such as mosaic diseases, there are doubtless many wild hosts that carry the infection throughout the winter. Better methods of insect control are also needed.—B. B. Higgins.

1331. CORY, E. N. Report of dusting and spraying investigations. Rept. Maryland Agric. Soc. 5: 318-327. 1920 [1921].—This report summarizes the recent results of dusting and spraying, and presents the results of dusting peaches, strawberries, and truck crops in Maryland. Dusting with 60 per cent sulphur—40 per cent lime controlled the peach lecanium (*Lecanium nigrofasciatum* Perg.). Dusting of strawberries proved successful, and dusting of truck crops offers great promise.—A. Lee Schrader.

1332. DICKSON, B. T. Diseases of the potato. Sci. Agric. 2: 202-206. Fig. 10. 1922.—This paper (one of a series) deals with potato canker, leak, and late blight.—B. T. Dickson.

1333. DICKSON, B. T. Diseases of the potato. Sci. Agric. 2: 234-236. 1922.—Sclerotinia wilt of potato occurred in Restigouche County, New Brunswick, during 1921. This disease, and the dry stem-rot and black scurf caused by *Rhizoetonia*, are both briefly discussed.—B. T. Dickson.

1334. DICKSON, B. T. Diseases of the potato. Sci. Agric. 2: 310-312. 1922.—This paper deals with early blight, wilt or fusariose, common scab, and silver scurf.—B. T. Dickson.

1335. DICKSON, B. T. Diseases of the potato. Sci. Agric. 2: 325-327. Fig. 13-14. 1922.—Black dot disease, caused by *Vermicularia varians*, is described for the 1st time from America. The 1st symptom is a slight yellowing of the foliage beginning at the tips of the leaflets and gradually involving the whole leaves, which finally become brown and withered. Under moist conditions, minute black sclerotia develop on the surface of the leaves and both inside and outside the lower part of the stems.—Potato dry rots and net necrosis are also briefly described.—Frederick V. Rand.

1336. DICKSON, B. T. Diseases of the potato. *Sci. Agric.* 2: 417-419. 1922.—This concluding section of the series briefly discusses black heart, frost necrosis, net necrosis, internal brown spot, spindling sprout, hollow heart, and arsenical injury under the general heading, Physiological Diseases. The paper concludes with general considerations on potato disease control.—*Frederick V. Rand.*

1337. DICKSON, B. T. Diseases of the potato. *Quebec Soc. Protection Plants Ann. Rept.* 14: 67-105. *Fig. 1-12.* 1922.—This paper brings together in one place the series concluded in the preceding entry. Some 25 potato diseases are classified under 8 groups according to type of cause and the salient known facts concerning each are briefly discussed.—*Frederick V. Rand.*

1338. DICKSON, B. T. Plant diseases of 1921 in Quebec. *Quebec Soc. Protection Plants Ann. Rept.* 14: 52-58. *Fig. 1-8.* 1922.—A brief account is given of some 20 commonly occurring diseases. The year 1921 in Quebec was typically a year of *Fusarium* root-rots and of mosaics.—*B. T. Dickson.*

1339. FAULL, J. H. Forest pathology in relation to forest conservation. *Quebec Soc. Protection Plants Ann. Rept.* 14: 14-22. *Fig. 1-5.* 1922.—This is an account of an invitation address given before the Society. Needle blight of white pine, heart rot of birch, butt and heart rots of balsam, etc., are discussed.—*B. T. Dickson.*

1340. FISHER, D. F. Spoilage of apples after harvest. *Ann. Rept. British Columbia Fruit Growers Assoc.* 32: 51-56. 1921.—Blue mold rot due to *Penicillium expansum* is the most important storage rot. Control consists mainly in avoidance of mechanical injury and sanitation of the packing house. Cooling to 32°F. reduces infection but does not effectively check progress of the disease where infection has already taken place. Scald is largely due to abnormal respiratory conditions resulting from poor aeration. Immature apples are more susceptible than those picked at maturity. Constant air movement, especially during the earlier period of storage, prevents or reduces it. Although humidity and carbon dioxide are proved not to be the cause, probably some gaseous excretion is responsible. The use of a small quantity of certain mineral oils of the "liquid petrolatum" type on the wrapping paper promises the best means of control, some of these giving complete control under the most unfavorable storage conditions. The minimum quantity of oil effective, as well as the best kind, has still to be determined.—*J. W. Eastham.*

1341. GARDNER, MAX W. Insects as disseminators of plant diseases. IV. Urgent problems of the future. *Phytopathology* 12: 233-240. 1922.—From the standpoint of economic importance and scientific interest, the most important problems in relation to insect-disseminated diseases are connected with the so-called virus diseases of the mosaic type. Some of the problems enumerated are: the nature of the mosaic contagion, infective principle, or virus; the host range of each virus with special reference to wild carriers of infection; the physiology of infection; transmission by means other than insects; the development of disease-resistant varieties; a better understanding of the life history and longevity of insects known to transmit the disease; the method by which diseases are carried and transmitted by insects; and more exact knowledge as to the species of insects capable of disseminating diseases.—*B. B. Higgins.*

1342. GARDNER, WRIGHT A. Notes on the physiology of the sweet potato. [Abstract.] *Phytopathology* 12: 251. 1922.

1343. GREAT BRITAIN MINISTRY OF AGRICULTURE AND FISHERIES. Collected leaflets on fungus pests of fruit trees. Sectional Vol. I. 60p., 21 pl. London, 1921.—An introduction by A. D. COTTON discusses the nature of fungi and modes of attack, methods of control and of cultivation and use of resistant varieties. Then follow the "collected leaflets" which take up

in turn some of the leading facts regarding the following diseases and their control: apple canker (*Nectria galligena*); apple and pear scab (*Venturia inaequalis* and *V. pirina*); apple mildew (*Podosphaeria leucotricha* Salm.); brown rot of apples (*Monilia fructigena* Pers.); blossom wilt of apples (*Monilia cinerea* forma *Mali*); crown gall (*Bacterium tumefaciens*); silver leaf in fruit trees (*Stereum purpureum*); wither-tip and brown-rot of plums (*Monilia cinerea* forma *Pruni*); die-back of fruit trees (*Cytospora leucostoma*); peach leaf-curl (*Eoasacus deformans*); American gooseberry mildew (*Sphaerotheca mors-uvae* Berk.); European gooseberry mildew (*Microsphaera Grossulariae* Lév); coral spot (*Nectria cinnabarina*); die-back of gooseberries (*Botrytis cinerea*); powdery mildew of the vine (*Uncinula necator* Burr.); and "reversion" or "nettlehead" of black currants. To this is added a list of 23 diseases of fruits not here discussed.—*Frederick V. Rand.*

1344. GREAT BRITAIN MINISTRY OF AGRICULTURE AND FISHERIES. Collected leaflets on cultivation and diseases of potatoes. Sectional Vol. III. ii + 69 p., 15 pl. (2 colored), 8 fig. London, 1921.—An introduction briefly outlines the history of the potato and adds a general statement concerning the diseases of this crop. The first three sections deal with the growing of the crop, and with the selection, storage, and treatment of the seed tubers. The remainder of the booklet discusses in turn the salient points regarding specific diseases and their control. The following diseases are taken up in some detail: blight (*Phytophthora infestans*); wart (*Synchytrium endobioticum*); powdery scab (*Spongospora subterranea* Lagerh.); blackleg (*Bacillus atrosepticus*); leaf-curl or leaf-roll; mosaic; scab (*Actinomyces scabies*); dry rot (*Fusarium caeruleum*); and *Sclerotinia sclerotiorum* Bref.—Other diseases more briefly described include skin-spot (*Oospora pustulans*); sprain; *Botrytis cinerea*; black scurf (*Corticium Solani*); violet root rot (*Rhizoctonia violacea*); pink rot (*Phytophthora erythroseptica*); *Verticillium* wilt (*V. albo-atrum*); streak; silver scurf (*Spondylocladium atrovirens*); and pit rot.—*Frederick V. Rand.*

1345. HABERLANDT, G. Wundhormone als Erreger von Zellteilungen. [Wound hormones as the cause of cell-division.] (Sonderabdruck aus den Beiträgen zur Allgemeinen Botanik, herausgegeben von G. Haberlandt, Bd. II, Hft. 1.) 53 p., 12 fig. Gebrüder Borntraeger: Berlin, 1921.—In studying the action of wound hormones on cell-division, tubers, roots, and leaves were mechanically injured. The tubers were cut into thin slices a part of which were washed under a heavy stream of water for 5–20 minutes, another portion covered with a thin layer of potato tuber ground up in a mortar, while others were held as checks.—In the case of kohlrabi roots cell-division was very slight in the washed slices or at least less frequent than in the unwashed slices, whereas in sections covered with a thin layer of macerated tissue there was abundant cell division.—Examination of leaves showed that under the brown cut edges every cell of the outer layer had divided and typical wound cork formation had followed, while cells in the regions remaining green had not divided with the exception of mesophyll cells directly under the injured epidermis. It was found that macerated tissue often caused cell-division in other members of the same plant family whereas it had no effect at all or was injurious to members of other families.—Tests with plant-hairs, epidermal cells, and guard cells showed that injury to individual cells when not severe enough to kill them caused typical nuclear division.—*Lillian C. Cash.*

1346. HARA, KANESUKE. Sosai kwaki no byôki to sono yobôhō. [Diseases of vegetables and ornamental plants and their control.] 145 p., 17 fig. Yoshimi Shoten, Shidzuoka, 1920. [In Japanese.]—This is a popular account for the grower, dealing with the principal diseases of vegetables and ornamental plants in Japan and recommendations for their control. An appendix takes up insecticides and insects injurious to vegetables.—*Frederick V. Rand.*

1347. HARTER, L. L. Field and storage diseases of the sweet potato and their control. [Abstract.] *Phytopathology* 12: 251. 1922.

1348. HASKELL, R. J. Relation of plant pathology to the newly organized Science Service. *Phytopathology* 12: 301–302. 1922.—Science Service with headquarters in Washington, D. C.,

has been organized for the purpose of gaining more rapid and accurate publicity for the results of scientific research by furnishing newspapers with accurate and well written articles. This outlet for popular articles on plant pathology presents an excellent opportunity to get information before the people in an easy, quick, and effective way.—*B. B. Higgins.*

1349. HOWARD, ALBERT. Disease in plants. *Agric. Jour. India* 16: 626-637. *Pl. 35-36, fig. 1-2.* 1921.—A popular account of a paper on the influence of soil factors on disease resistance, which appeared in *Ann. Appl. Biol.* 7: 373. 1921. [see *Bot. Absts.* 11, Entry 558.]—The discussion includes rust in wheat, green fly on fruit trees, red-rot in sugar-cane, and wilt diseases of several crop plants in Bihar.—*A. Howard.*

1350. LEE, H. ATHERTON. Observations on previously unreported or noteworthy plant diseases in the Philippines. *Philippine Agric. Rev.* 14: 422-434. *Pl. 17-24.* 1921.—Brief notes are given on 49 diseases of citrus fruits, banana, abaca (Manila hemp), maguey (Agave), pineapple, tobacco, coconut, and sugar-cane. Twenty-two of the diseases listed are recorded from the Philippines for the 1st time. A short general discussion concludes the paper.—*E. D. Merrill.*

1351. LEE, H. ATHERTON, AND MARIANO G. MEDALLA. The season's experiments on Fiji disease, mosaic disease, and smut of sugar cane. *Philippine Agric. Rev.* 14: 402-412. *Pl. 1-8.* 1921.—The season's experiments with Fiji disease of sugar cane show that germination of points from affected canes is much poorer than from healthy and that the occurrence of the disease is not directly connected with soil conditions but is transmitted by cane cuttings. The spread from diseased to adjacent healthy plants was surprisingly low throughout the season. The results show that the losses from this disease are largely due to the use of points or cuttings from diseased stools.—The results with mosaic of sugar-cane showed that the germination of points from affected stools is usually poorer than from healthy stools and that the disease may be produced at will on any soil irrespective of drought by using points from diseased stools. The experiments corroborate those in Java, Hawaii, and Porto Rico as showing that cuttings from diseased stools reproduce mosaic in a large percentage of cases, usually 100 per cent. An unexpected result was the very small amount of transmission from affected to healthy stools during the past season under Canlubang conditions. It is evident also that in the course of the season a small portion of plants may grow out of the disease to such an extent that leaf signs are no longer visible.—Experiments with cane smut showed that germination of points from smut-infected stools is reduced, that a large percentage of points or cuttings from such stools reproduce the disease, and that the cane yield in such cases is usually a total loss. In the 6 months under experiment the spread to healthy stools in the field was very small. Points from healthy stools soaked in the same receptable with cane from smutted stools showed 8.33 per cent of resulting canes affected.—Planters growing susceptible varieties should select "seed" only from healthy stools.—*Frederick V. Rand.*

1352. LEE, H. ATHERTON, AND GONZALO MERINO. The prevention of the importation of injurious insects and parasitic fungi on economic crops from foreign countries. *Philippine Agric. Rev.* 14: 389-401. 1921.—This is a brief discussion of the author's Philippine experiences, with copies of local regulations adopted and a list of fruits prohibited from entry into the Philippines.—*E. D. Merrill.*

1353. MARLATT, CHARLES LESTER. Protecting the United States from plant pests. *Nation. Geog. Mag.* 40: 205-218. *16 fig.* 1921.—Insect and fungous enemies of plant life are discussed and illustrated, emphasis being placed on the quarantine measures now protecting the country against their introduction.—*W. M. Atwood.*

1354. MOLL, FRIEDRICH. Untersuchungen über Gesetzmässigkeiten in der Holzkonservierung. Die Giftwirkung anorganischer Verbindungen (Salze) auf Pilze. [An investigation of the chemical laws underlying wood preservation. The toxic action of inorganic com-

pounds (salts) on fungi.] Dissertation, Berlin, 1920: 23 p. 1920. [Published also in Centralbl. Bakt. II Abt. 51: 257-279. 1920 (See Bot. Absts. 10, Entry 788).]—A brief introduction and review of previous studies on wood preservation is followed by an account of the present investigation from which the author concludes that the poisonous or antiseptic action of salts is an additive character of their ions. In the sequence of their antiseptic activity the ions are: mercury, silver, cadmium, cyar, copper, zinc, cobalt, chromium, and fluorine. Most acid ions and the ions of the alkaline metals, alkaline earths, and aluminium may be considered inactive. The antiseptic action, using *Penicillium glaucum* and *Merulius* sp. as indicators, depends on the solubility and ionization of the salts in water. The specific antiseptic action is dependent on a specific chemical reaction. Admixture of other salts to the active substances may either retard or accelerate the disinfectant action but the end result is unaltered. The activity of a given quantity of a soluble salt or salt mixture depends only on the quantity of active ingredients in the mixture and on their specific activity. The static activity is dependent on the stoichiometric laws of chemical reactions. In so far as the salt mixture does not yield insoluble precipitates or complex compounds the individual ions retain their specific activity, and the activity of the mixture may be conceived as the sum of the activities of the individual ions.—*Frederick V. Rand.*

1355. NAVEL, HENRI C. Les principaux ennemis du cacaoyer aux Iles de San-Thomé et de Principe. Rapport sur une mission d'étude agricole et phytopathologique. [The principal enemies of cacao in the Islands of Saint Thomas and Principe. Report of an agricultural and phytopathological survey.] 135 p., 32 pl. (4 colored), 3 fig., 2 maps. Émile Larose: Paris, 1921.—An introduction gives the situation, size, geography, geology, and climate of these islands, and a general discussion of cacao enemies.—The body of the work takes up in turn the non-parasitic troubles, animal parasites (principally insects), and cryptogamic diseases of this host.—Among the non-parasitic troubles some space is given to a discussion of wounds, lack of proper hygienic measures, suppression of shade, insufficient rainfall, faulty methods of planting, drainage troubles, opening of holes for planting and manuring, and sudden death of the trees.—The principal animal parasites discussed are: *Heliothrips rubrocinetus* Giard. (thrips), *Helopeltis* sp., *Nisotra Theobromae*, *Aspidiotus trilobitiformis* Green and other species of cochineal insects, *Lygidus varicolor* Berlioz, *Zeuzera Coffeae*, *Eulphonolotus myrmeleon* Feld, *Mallodon Downesi* Hope, *Apate Monachus* L. (the last 3, borers), *Neoterme gestri* F. Silv., *Microcerotermes parvus Theobromae* Dess., and *Mirotermes Amaralii* Seabra (the last 3, termites).—Among mammalian enemies, rats and monkeys are discussed and several other animal parasites are briefly noted.—The cryptogamic diseases taken up in detail are those caused by *Phytophthora Faberi* Maubl. (mildew and canker), *Lasiodiplodia Theobromae* (Pat.) Griff. & Maubl., drying of the ends of branches due to the combined effects of bad climatic and cultural conditions but accompanied by *Fusarium*, *Nectria*, and other apparently saprophytic fungi, and various forms of decay. Added notes are given relative to several other cryptogamic diseases of cacao.—A chapter on the general principles of culture and maintenance is followed by an appendix in which are discussed a disease of the palm-oil tree (*Elaeis guineensis*) caused by *Ganoderma applanatum* Pers.; injury to the cocoanut tree caused by the beetle *Oryctes latecavatus* Fairm.; and the preparation of fungicides and insecticides. A list of the principle publications on cacao concludes the work.—*Frederick V. Rand.*

1356. NOWELL, WM. Report on an investigation of frog hopper pest and diseases of sugar-cane in Trinidad. Bull. Dept. Agric. Trinidad and Tobago 18: 57-69. 1919.—This report is a discussion of the "root disease" of sugar cane in Trinidad and the relation of the frog hopper and species of *Marasmius* and *Odontia* to this disease. Remedial measures, such as sanitation, rotation, and manuring, are advised.—*Florence A. McCormick.*

1357. PEACOCK, N. D. The less common spray materials. [Abstract.] Phytopathology 12: 251-252. 1922.

1358. PEGLION, VITTORIO. Le malattie delle piante coltivate cagionate da parassiti vegetali o da agenti inanimati. [Diseases of cultivated plants due to vegetable parasites or

non-living agents.] 4th rev. and amplified ed., 663 p. Casale Monferrato: Ottavi, 1922.—The preliminary chapters deal with general subjects such as the economic significance of diseases with special reference to the crop, the scope of plant pathology, the classification of plant diseases, virulence, parasitism and resistance, fungicides and their application. The diseases of different crops are then treated in turn; in each case the causal organism, its effect on the host, and preventive treatment are considered.—*Lillian C. Cash.*

1359. RAMSAY, A. A. "Liquid sulphur." Agric. Gaz. New South Wales 33: 525. 1922.—Sodium sulphide has been recommended as a ground treatment under orchard trees. If there is virtue in the method there appears to be no reason why lime-sulphur should not be substituted.—*L. R. Waldron.*

1360. RAMSAY, A. A. Two investigations in relation to sprays. Agric. Gaz. New South Wales 33: 513-514. 1922.—With home-made tobacco infusions the end result relative to the degree of acidity is not essentially changed whether anhydrous sodium carbonate is or is not used. In the preparation of a triple-purpose spray consisting of Bordeaux mixture, tobacco extract, and lead arsenate the amount of soluble arsenic found in the filtrate after 2½ days was safely below the allowable minimum.—*L. R. Waldron.*

1361. RAND, FREDERICK V. Insects as disseminators of plant diseases. I. Results of past investigations. Phytopathology 12: 225-228. 1922.—In a brief discussion and summary of the results of previous work on the relation of insects to the dissemination of plant diseases, insect dissemination as a whole is divided, according to type, into 5 groups: (1) external dissemination and direct inoculation; (2) external dissemination without direct inoculation; (3) wound infection from sources other than the wounding agent; (4) internal mechanical (unchanged), and (5) internal biological dissemination (multiplying within the carrier).—By means of a table and brief discussion the author states that proof or strong evidence of insect dissemination has been published for 1 protozoan, 16 bacterial, and 41 fungous diseases; and for the filterable contagium group of diseases as affecting 66 hosts.—*B. B. Higgins.*

1362. SANDERS, T. W. Fruit foes. 106 p., 29 pl. (13 colored), 31 fig. W. H. & L. Collingridge: London, 1921.—This handbook deals with "the various insect, animal and fungal pests that attack fruit trees, with remedies for their prevention and eradication."—Under each of the following hosts, alphabetically arranged, is taken up its particular enemies: apple, apricot, blackberry, cherry, currant, fig, gooseberry, loganberry, nuts, peach and nectarine, pear, plum and damson, raspberry, strawberry, and the vine.—Parts II and III deal with sprayers and spraying, and with insecticides and fungicides.—*Frederick V. Rand.*

1363. STEVENS, H. E. Avocado diseases. Florida Agric. Exp. Sta. Bull. 161. 23 p., 6 fig. 1922.—All available information on avocado diseases in Florida is brought together.—Avocado scab (*Cladosporium Citri* Massee) as a disease of the foliage and fruit is most common on young plants in the nursery, where it is difficult to control. It is especially a foliage trouble on the varieties of the West Indian group but fruits of the varieties Trapp, Taylor, and Fuerta are also very susceptible. Infection takes place only on the tender young growth, plants becoming immune when the leaf tissue hardens. In the nursery badly infected old leaves should be sprayed with 4-4-50 Bordeaux mixture before new growth starts. After new growth begins spraying with ammoniacal copper carbonate solution should be repeated weekly until growth becomes hardened. A 3-3-50 Bordeaux mixture is sufficient to control scab on the fruit. On the lower East Coast of Florida black spot (*Colletotrichum* sp.) causes much loss in seedlings. These spots are round, brown to dark brown or black, $\frac{1}{8}$ – $\frac{1}{2}$ inch in diameter, and the dry, hard tissues penetrate the skin of the fruit to the flesh, less matured fruit sometimes becoming misshapen. Spots also appear on the bark of young shoots. Bordeaux mixture (4-4-50) gives some control here. A 2nd application should follow 3-4 weeks after the 1st. Avocado blotch (*Cercospora* sp.) which frequently occurs first, and black spot are often found together. Avocado blotch causes a surface spotting on seedling fruits, spots being $\frac{1}{8}$ – $\frac{1}{4}$ inch in

diameter. Its control is similar to that of black spot. Rusty blight (*Glæosporium* sp.) is troublesome in Hawaii and may be present in Florida. Other diseases mentioned are powdery mildew (*Oidium* sp.) of the foliage, though this is not likely to be troublesome; and russet fruit, which injures the fruit.—*J. C. Th. Uphof*.

1364. TICE, C. Seed potato inspection and certification in British Columbia. *Sci. Agric.* 2: 249-251. 1922.—The author presents a statement of the percentages of disease allowed.—*B. T. Dickson*.

1365. WENIGER, WANDA. Potato diseases and their control. (In: *Potato hand book*.) North Dakota Agric. Exp. Sta. Ext. Div. Circ. 50. 14-19, fig. 1-3. 1922.—Following a key to potato diseases, a brief popular discussion is given of disease control by rotation, seed treatment, selection, storage, and handling.—*Frederick V. Rand*.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 983, 1142, 1511, 1520)

1366. ANNETT, HAROLD E. Investigations of Indian opium. *Pharm. Jour.* 108: 192-193. 1922.—The investigation deals with the influence of environmental factors, such as manures, climate, season, and stage of development of the capsules on the quantity and quality of the opium produced. In 1 series 1,000 terminal capsules gave 31.4 gm. of dry opium containing 15.7 per cent of morphine, while 1,000 lateral capsules gave 12.8 gm. of dry opium, containing 8.2 per cent of morphine. The yield of morphine was greatest from opium collected about 8-16 days after flowering. Cattle manure, nitrates, phosphates, or seed cakes alone or in combination over 4 years had but slight influence on the morphine yield of opium but did increase the total yield of opium. Weather conditions have little effect on the morphine yield but a very notable effect on the opium yield. With pure seed and equally good methods of cultivation opium produced on the plains or in the hills of India runs as high in morphine content as Turkey opium.—Morphine is produced during the period of active growth at the same rate as the plant tissues; it accumulates in the capsule but is not used in the ripening of the seed; the theory that it is an end-product of metabolism, excretory in nature, seems to be borne out.—*E. N. Gathercoal*.

1367. BENNETT, C. T. Oil of Cade. *Pharm. Jour.* 107: 166. 1922.—Genuine Cade oil must be derived exclusively from the wood of *Juniperus oxycedrus* by dry distillation. It has always been somewhat variable in character, particularly as regards specific gravity. In the British Pharmacopoeia it is "about 0.990"; in the United States Pharmacopoeia the specific gravity is stated as "0.980 to 1.055 at 25°." During the last few years there has been difficulty in obtaining this oil with the specific gravity over 0.975. It is now produced commercially mostly in Spain, and genuine Spanish oil may run as low as 0.955.—The bushy shrub of Juniper grows abundantly in the chalky marl of Provence and adjacent provinces. The heartwood is richest in oil, increasing in its content towards the roots. The bark is removed and the wood chipped as small as possible. The dry or destructive distillation is performed in cast-iron boilers, filled with shavings or chips of the wood, with a delivery tube at the bottom and by means of a brisk fire of wood completely surrounding the boiler. The blackish viscid distillate upon standing for a considerable time separates into 3 layers, the oil of Cade being uppermost. Spanish Cade oil, though of low specific gravity, can be accepted as genuine; it contains a high proportion of cadinene.—*E. N. Gathercoal*.

1368. BURTT DAVY, JOSEPH. Utilization of maize flowers. Stalks and leaves 1. *South African Jour. Indust.* 5: 324-329. 1922.—This instalment deals with the medicinal uses and

properties of maize silk (*Stigmata Maydis*) and maize smut (*Ustilago Maydis*). It also contains a preliminary paragraph on the utilization of Maize stalks as a source of syrup, cane sugar, alcohol, etc.—*Sydney M. Stent*.

1369. COMPTON, R. H. Medicinal and aromatic plants in South Africa. Jour. Bot. Soc. South Africa 8: 9-11. 1922.—Aloes is the evaporated juice of the leaves of *Aloe ferox*. *Buchu folia* is the dried leaf of *Barosma betulina*, *B. crenulata*, and *B. serratifolia*. "Bitter blaar" (*Brachylaena elliptica*), "Kankerbos" (*Sutherlandia frutescens*), "Zandolien" (*Dodonea Thunbergiana*), and "Kruidje-roer-my-niet" (*Melianthus niger*) are highly esteemed home-made medicaments. The possibility of producing essential oils in South Africa is being studied at Kirstenbosch.—*E. P. Phillips*.

1370. COUCH, JAMES F. Note on the oil of *Agastache pallidiflora*. Amer. Jour. Pharm. 94: 341-343. 1922.—Having had his attention directed to this plant by the intense fragrant odor, the author subjected several lots of the flowering heads and leaves to distillation. The flowers yielded 0.184-0.316 per cent of oil and the leaves 0.083 per cent. The oils obtained from the flowers possessed a penetrating peppermint odor with a marked suggestion of thyme, while the oils from the leaves possessed a rank thyme odor. Physical constants for the oil from the flowers are: density at 20°, 0.91924; specific rotatory power at 25°, 8.60; index of refraction at 25°, 1.4865. No separation of crystalline material was obtained by cooling and the tests for phenols were negative.—*Anton Hogstad, Jr.*

1371. E[ATON], B. J. Ipecacuanha. Alkaloidal content of leaves and stems. Agric. Bull. Federated Malay States 9: 178. 1922.—In the roots the percentage of alkaloids was found to be 2-2.5, of which $\frac{1}{2}$ - $\frac{3}{4}$ was emetine; in the stems and leaves the amount of alkaloids was 1.5 per cent, of which 0.45 was emetine.—*I. H. Burkill*.

1372. EZENDAM, JOH. A. De kwantitatieve botanische analyse van veevoedermiddelen. [The quantitative botanical analysis of feeding cakes.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 25: 1-82. Pl. 1-6. 1921.—The author explains the advisability of a quantitative analysis of feeding cake, etc., to determine its purity. He mentions and discusses the most important methods of analyzing linseed cake and those used for analyzing other feeding cakes. The methods investigated and the author's comment on their general or specific practicability are as follows: (1) Method of Pesch,—impractical. (2) Method of Schaffnit,—impractical. (The author's modification of this method is too lengthy, and is practicable only for linseed cake investigation.) (3) Method of Grevillius,—too time consuming and practicable only for linseed cake. (4) Method of Schoute,—the same conclusion as in (3). (5) Netherlands or counting method,—useful only for linseed cake and rapeseed cake investigations. (6) Mechanical-optical analysis of van Weinzierl,—not sufficiently accurate and practical only for special cases. (7) Method of Kühn,—very good for quantitative analysis of those particles which have a much higher or lower specific weight than the feeding cake in which they are present; therefore useful only in special cases. (8) Method of Hintner,—may be used in some cases where the particles to be analyzed are coarse and may easily be recognized or made recognizable. (9) Method of Kole,—practical for determination of contents of cottonseed husks in cottonseed meal. (10) Method of Arthur Meijer, like the method of Huss, is practical when there are particles present which can be used for measurements. The author developed a method in which the principle was to find an element for measuring in those cases in which the amount of a certain constituent could not be found from a comparison by counting (Netherlands method), or from a comparison by measuring (method of Schoute), or when no measurable elements or particles were present, according to the method of Arthur Meijer. The author grinds a sample of the cake until it passes a screen with circular holes 1 mm. in diameter. A definite quantity (0.5-2 gm.) is boiled with acids and alkali and washed with hot water on muslin cloth (43 threads per cm., opening in wet cloth \approx 100 μ). The remaining substance is mixed with 10 cc. of a mixture of glycerine and water (1:1). This is spread on a special glass plate and measurements are made with a Nebelthau or similar micro-

scope, using objective 3 and net micrometer-ocular 3 of J. C. Schoute. After 15 minutes particles are measured in at least 3 strips and at least 300 fragments. Measuring is the determination of the number of squares each particle covers. Then the sum total of the squares covered by all particles is divided by the number of grams used, the total surface of the rows (each row is 1.2 square cm.), and by the normal number. The number obtained gives the percentage of the impurity or particles present.—The normal number is the number of squares covered by the fragments of impurities, or of a certain substance, present on 1 square cm. using 1 gm. of a 1 per cent mixture of impurity or substance. The normal number must be determined for each impurity or substance. The author states that the usefulness of this method depends mainly upon the exactness of the normal number. Plates give photographs and drawings of some of the impurities investigated. Investigations were made and normal numbers determined for the following impurities or admixtures: rice husks, barley husks, ground nut shells, coffee husks, cacao husks, soy bean, and impurities in linseed cake. [See also Bot. Absts. 11, Entry 647.]—*Peter J. Klaphaak.*

1373. FARWELL, O. A. Botanical source of the cola nut of commerce. Amer. Jour. Pharm. 94: 428. 1922.—Quoting I. H. Burkill in Notes on Cola Trees in the Economic Garden, Singapore [see Bot. Absts. 8, Entry 1540], the author states that the *Sterculia acuminata* Beauv. of Benin does not produce the Kola Nut of Sierre Leon, which is the Kola of commerce, but that the larger part is derived from *Sterculia nitida* Vent. He also points out that *Bichea* Stokes (Bot. Mat. Med. 2: 564. 1812) is the oldest generic name for these species and therefore *Sterculia nitida* Vent. Jard. Malm. sub. t. 91, 1804, should be *Bichea nitida* (Vent.) Farwell n. comb.—*Anton Hogstad, Jr.*

1374. FARWELL, O. A. *Osyris alba* substitute for *Scoparius*, N. F. Amer. Jour. Pharm. 94: 429. 1922.—Attention is called to the fact that *Osyris alba* is again making its appearance as a substitute for Broom Tops, to which it bears a close resemblance. It may however be detected by the following characters: (1) the stems are many-striate instead of 5-angled or winged; (2) the buds are at the apex of an angle, which forms a keel on the dorsal side of the bud, instead of in the channels between the angles; (3) the wood is white instead of yellowish.—*Anton Hogstad, Jr.*

1375. GARRIGUES, A. Les plantes en médecine: le seigle et l'ergot. [Medicinal plants: rye and ergot.] 254 p., 22 fig. Libr. Octave Doin: Paris, 1921.

1376. GATHERCOAL, E. N., and R. E. TERRY. What is aloes, U. S. P.? Jour. Amer. Pharm. Assoc. 11: 523-526. 1922.—In reviewing the characteristics of, and the various tests applied to aloes, the authors suggest that it is no longer worth while to differentiate between the 3 kinds of aloes, especially from a therapeutic standpoint, since no physician specifies the use of any particular kind of aloes or aloin. They suggest that, as the value of aloes is not entirely due to aloin, there is excellent opportunity for study of the therapeutic activity of aloes compared with aloin.—*Anton Hogstad, Jr.*

1377. GUNTON, J. A., and G. D. BEAL. A reinvestigation of the proximate composition of *Rhamnus frangula*. Jour. Amer. Pharm. Assoc. 11: 669-682. 1922.—In this investigation to determine whether the anthraquinone derivatives were present in the free form or principally in combination, possibly as a glucoside, the glucoside frangulin was found to agree in properties with that which has been previously described; M. P. 229°, and upon hydrolysis yielding emodin and rhamnose. Emodin, the principal hydroxyanthraquinone present, was found in both free and combined forms and agrees with the properties of that from *Cascara* and *Rumex crispus*; M. P. 253°. Chrysophanic acid was found free and associated with monomethyl ether; M. P. 190°. Various other constituents resulting from the analysis are discussed.—*Anton Hogstad, Jr.*

1378. HEYL, F. W. Some constituents of *Viburnum opulus*. Jour. Amer. Pharm. Assoc. 11: 329-336. 1922.—By extracting the drug with methyl alcohol and pouring the extract into water, a resin was obtained in which acetic, valerianic, caproic, caprylic, formic, oleic, linoleic, cerotic, and palmitic acids were found in the ligroin extract.—Anton Hogstad, Jr.

1379. HOLMES, E. M. Oregon balsam. Pharm. Jour. 108: 146-147. 1922.—The author reviews and compares the source, method of collection, and uses of Canada balsam and Oregon balsam. As the cost of Oregon fir balsam is about $\frac{1}{3}$ that of Canada balsam, it will probably replace the latter for many purposes, except in microscopic technique.—E. N. Gathercoal.

1380. HOPKINS, J. L. Crude drugs—their selection and milling. Jour. Amer. Pharm. Assoc. 11: 521-523. 1922.—The author remarks briefly on the great care exercised in collecting, milling, and examining crude drugs in order that the materials may represent the highest percentage of purity and potency.—Anton Hogstad, Jr.

1381. KABAYAO, D. S. The effect of heating *Cocculus indicus* in relation to chemical identification of picrotoxin. Amer. Jour. Pharm. 94: 425-428. 1922.—By heating the kernels in a nickel crucible over a free flame and then extracting by the modified Stass-Otto, method the extracted poison gave a negative reaction with Langley's reaction and also with Fehling's solution. The extracted poison, however produced the typical picrotoxin convulsions when injected into the dorsal lymph sac of the frog. In another experiment the kernels were heated in an oven at 104°C. and extracted as above. In this case the Langley and Fehling reactions, as well as the physiological reaction, were positive. By heating commercial picrotoxin above its melting point (203°C.) negative tests were obtained with Langley's and Fehling's solution. By these experiments the author has shown that the intramolecular rearrangement is due to heating at a high temperature and probably not to oxidation changes, as one heating experiment was carried on in a stream of hydrogen. The author states that the commonly recognized tests for the identification of picrotoxin cannot be depended upon when, as is the custom, the berries have been roasted over a free flame.—Anton Hogstad, Jr.

1382. KARSTEN, GEORGE, und WILHELM BENEKE. Lehrbuch der Pharmakognosie. [Text book of pharmacognosy.] 8 vo, 3rd ed., vi + 398 p., 544 fig. Gustav Fischer: Jena, 1920.

1383. LAVIALLE, P. Les plantes médicinales. [Medicinal plants.] Mulhouse, 1921.

1384. LLOYD, J. U. Vegetable drugs. The Caxton: Cincinnati, 1921.

1385. MACBETH, ALEXANDER KILLEN, and ROBERT ROBINSON. Cevadine. Part I. Jour. Chem. Soc. [London] 121: 1571-1577. 1922.—The paper deals with the optical activity, products of hydrolysis, and distillation compounds of cevadine, a crystalline alkaloid occurring in the mixture of bases termed "veratrine," first isolated from the seed of *Veratrum sabadilla*.—F. E. Denny.

1386. MUSZYNSKI, JAN. Investigations of Polish foxglove. Pharm. Jour. 107: 443. 1922.—There are 2 kinds of foxglove in Poland,—*Digitalis purpurea* L. and *D. ambigua* Murray,—though the former is very rare. The latter is abundant throughout almost every part of the country and is collected not only for local uses but also for export. An examination of the physiological action of the 2 plants cultivated at the state medicinal farm was made, the physiological method of Focke using *Rana esculenta* being employed. Strophanthinum Crystal, Merck, 1: 10,000, was always used as a check. About 200 experiments were carried out. The following conclusions were reached: (1) *D. ambigua* should be accepted by pharmacopoeias as the substitute of *D. purpurea*. (2) The garden foxglove (*D. purpurea* var. *gloxiniæflora*) produces a good drug. (3) The requirements of pharmacopoeias should permit the collection of flowers and leaves of the 1st year's growth. (4) A physiological assay of foxglove is necessary for its control.—E. N. Gathercoal.

1387. PARRY, E. J. **The chemistry of essential oils and artificial perfumes. I. Monographs on essential oils.** 4th ed., rev. and enlarged, viii + 549 p., 52 fig. Scott, Greenwood & Son: London; D. Van Nostrand Co.; New York, 1921.

1388. PRICE, E. A., and NOEL L. ALLPORT. **An improved method of preserving specimens for a herbarium.** Pharm. Jour. 108: 9-10. 1922.—The plant parts are placed between white blotting paper, 6 sheets above and 6 below, and pressed for 20 minutes with an ordinary 2-pound flat iron heated to about 110°C. There should not be sufficient heat to decompose the chlorophyll or other coloring matters. The plant parts become dry and rigid but otherwise retain their natural appearance and color. The specimen should be painted over with a 0.5 per cent solution of mercuric chloride in absolute alcohol and mounted on herbarium paper with mucilage of acacia. The leaves or flowers may be separated from the axis and the latter partially or wholly dissected. After the preservation treatment the parts are strong and inflexible and there is no difficulty in reassembling the parts. With the Compositae and Orchidaceae especially successful work has been done. A collection of plants preserved and mounted as described has retained the color of both flower and foliage for 8 years.—E. N. Gathercoal.

1389. SMALL, JAMES, and F. M. J. ADAMS. **Yohimbe bark: Its history and identification in commerce.** Pharm. Jour. 108: 282-285, 311-314. 12 fig. 1922.—Genuine yohimbe bark, derived from *Pausinystalia Yohimba*, usually occurs in channelled pieces, 4-10 mm. thick, with a varying tinge of red in the grey-brown or brown outer and inner surfaces; the outer surface is longitudinally furrowed, the edges of the furrows scarcely or not at all raised above the general level of the surface; numerous narrow transverse cracks occur on the outer surface at fairly regular intervals of 1-2 cm.; the cork adheres closely. Occasionally such bark is derived from very old tree trunks, and is then dark red on the inner and cut surfaces; 15-20 mm. thick; with a scaly outer bark showing few or no transverse cracks. Occasionally also this bark seems to be derived from the smaller branches rather than from the trunk of the tree, and is then much thinner, 2-3 mm. thick; while the transverse cracks are very narrow, shallow, and inconspicuous, but still evident on careful inspection. Transverse sections under the microscope show a characteristic "beaded" alternation of bast fibers with parenchymatous cells, and also show little or no "twinning" of the bast fibers, especially in the outer zone of the bast where the rows are fewer. A few scrapings from the inner surface of the secondary bast, when shaken with dilute caustic soda solution (10 drops of a solution of NaOH, sp. gr. 1.168 in 30 cc. of water) give a red color, varying in different samples from wine-red to distinctly reddish-brown. Treated in the same way with dilute ammonia (5 drops of 0.880 solution in 10 cc. of water) the same colors are developed; this ammonia test is usually more distinctive but the color may develop more slowly. False yohimbe bark, derived from *Pausinystalia macraceras*, usually occurs in channelled, or flattened and severely scraped pieces; 4-15 mm. thick; with little or no red tinge; usually with a dark brown outer surface, showing, when unscraped, characteristic longitudinal furrows, the edges of which are puckered so that they stand up as rounded ridges above the general level of the surface; transverse cracks when they occur are few and very irregularly spaced; the cork frequently exfoliates easily. Transverse sections under the microscope show little or no "beading" in the radial rows of bast fibers, but do show "twinning" of these fibers; this feature, when it extends to the outer bast, is a good diagnostic character. A few scrapings from the inner surface, treated with caustic soda or ammonia as described above, give a brown color, with a faint tinge of red. The barks of *Pausinystalia Talbotii* Wernh., *Corynanthe paniculata*, and *C. Lane-Poolei* were examined and compared with true yohimbe bark. The illustrations are valuable and a table of diagnostic characters of each of the barks is appended.—E. N. Gathercoal.

1390. SMODLAKA, N. **The history and therapeutic properties of valerian.** Pharm. Jour. 107: 402-405. 1922.—Valerianic acid is considered the active principle of valerian, occurring in the drug as the borneol ester. This salt of the acid prepared synthetically has been used for some 20 years, but is not considered as satisfactory as the drug itself and does not re-

place the drug for the treatment of hysteria, neurasthenia, nor affections of the heart. This confirms once more Tschirch's hypothesis that in a drug, in most cases at least, not one or the other active principle is the exclusive therapeutic agent, but that the physiological effect is a result of the complex of active principles. One of the best galenicals is the dialysate, prepared from the fresh root in which the enzyme has been destroyed by heating the root to 80°C. in acidulated water. This process is known as stabilization. The author found that he could stabilize valerian by keeping it in vacuo above boiling water for ten minutes at 100°C. Preparations made by extraction with alcohol and with ether gave extractions that were equally fit if not superior to the extract obtained by dialysis. In fact, it would appear that the therapeutic effect is due to the resin contained in the drug rather than to volatile oil. This hypothesis is borne out by pharmacodynamic experiments with frogs. Extract in aqueous or hydro-alcoholic solution cannot be kept in good condition; it deteriorates very quickly in contact with water. The ethereal tincture of the fresh stabilized drug is undoubtedly the best form in which to preserve the active principles.—*E. N. Gathercoal*.

1391. STENT, SYDNEY M. "Dubbeltje" (*Tribulus terrestris*) and Geeldikkop in sheep. Jour. Dept. Agric. Union South Africa 4: 548-551. 1 fig. 1922.—This weed belongs to the family Zygophyllaceae and bears fruit armed with sharp-pointed spines. In certain stages of growth under certain climatic conditions it is poisonous to sheep and goats, and it has been determined that when these animals grazed on dubbeltje veld during hot sunny days, succeeding a heavy fall of rain, when the plant is green and succulent and in the flowering stage, are certain to contract the disease "Geeldikkop" (*Tribulosis avium*). This disease is described and remedies prescribed.—*L. Goldblatt*.

1392. STENT, SYDNEY M. Poisonous properties of Sudan grass. Jour. Dept. Agric. Union South Africa 4: 446-447. 1922.—This grass, like the ordinary sorghum, sometimes causes poisoning in stock owing to the presence of a compound of prussic acid. Glucose, dextrose, and other sugars act as antidotes, while a teaspoonful of soda dissolved in a pint of diluted vinegar has been found an effective remedy. Feeding the animals on starchy food before turning them into the Sudan grass diminishes the danger of poisoning. When made into hay Sudan grass is very unlikely to be harmful.—*L. Goldblatt*.

1393. TANRET, GEORGES. Sur la composition chimique de l'ergot de diss et de l'ergot d'avoine. [On the chemical composition of the ergot of *Ampelodesmos* and of oats.] Compt. Rend. Acad. Sci. Paris 174: 827-830. 1922.—The ergot of *Ampelodesmos tenax*, a plant of northern Africa, and that of oats have the same medicinal principles as does the ergot of rye. The ergot of *Ampelodesmos* is low in crystallizable ergotine; while that of oats has a higher ergotine content than the ergot of rye.—*C. H. Farr*.

1394. VIEHOEVER, ARNO. Problems, we, as officials, have in common with the trade. Jour. Amer. Pharm. Assoc. 11: 592-595. 1922.—The author discusses some of the many problems confronting the honest dealer in crude drugs and the officials entrusted with the enforcement of the U. S. A. Foods and Drugs Act. Among the problems considered are methods of collection, drying, cleaning fresh drugs and spices, storing, and sampling. Reference is included to some of the tests applied during the course of examination of crude drugs.—*Anton Hogstad, Jr.*

1395. WHELAN, JULIA. Oil of *Bystropogon canus*. Jour. Amer. Pharm. Assoc. 11: 337-338. 1922.—Upon subjecting 28 pounds of herb to distillation, 25.5 gm. (= 0.2 per cent) of oil separated from the aqueous distillate and 13.7 gm. were obtained by 3 cohobations. Both oils were of greenish color, not unlike Bergamot oil. The original oil appeared to have more of the nature of fatty acid esters than of menthol. Tests, for pulegone, thymol, menthol, and carvacrol were negative. On account of the small amount of oil at hand no chemical examination was made. A few constants are included.—*Anton Hogstad, Jr.*

1396. YOUNGKEN, HEBER W., and C. H. LAWALL. *Anatomical and chemical studies of the sand spur (Cenchrus tribuloides L.)*. Amer. Jour. Pharm. 94: 567-583. Fig. 1-14. 1922.—In their endeavor to ascertain the cause for the inflammation, which is in many instances induced by the spines of the plant, the authors find that their tests tend to show that formates may be present in certain cells of the epidermis, sclerenchyma fibers, and barbs of the younger spines of the burs. Tests for alkaloids as well as for glucosides or other similar toxic principles were negative. Various extracts made from mature burrs with water, ether, petroleum, or alcohol lacked activity or irritating properties as indicated by taste or by inoculation with pin prick. The authors have also reviewed the previous literature and have presented detailed anatomical characters which are accompanied by many original figures.—*Anton Hogstad, Jr.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 955, 1011, 1022, 1053, 1063, 1064, 1113, 1121, 1123, 1203, 1273, 1295, 1316, 1342, 1345, 1366, 1513, 1517)

GENERAL

1397. KAYSER, E. *Microbiología agrícola, aplicada a la fertilización del suelo*. [Agricultural microbiology with application to soil fertility.] [Translation from the 4th French ed.] 351 p., 49 fig. P. Salvat: Barcelona, 1921.—This volume is one of a series of works constituting an "Encyclopedia of Agriculture" and at the time of its appearance 29 had been published, and 5 others were in press or in preparation, all dealing with applied sciences or technical agriculture. In part 1 of the present volume 21 pages are devoted to a general discussion of microorganisms, and 36 pages to the influence of physical and chemical agents upon such organisms, including a discussion of culture methods and staining properties. In part 2 (269 p.) there are treated successively the distribution of microorganisms in the superficial layers of the soil, the formation of humus, nitrification, decomposition phenomena, denitrification, purification and use of sewage, fixation of nitrogen, and the cycle of sulphur and iron. In an appendix of 13 pages the importance of soil reaction and methods of determining H-ion concentration are succinctly presented.—*B. M. Duggar.*

1398. OSTWALD, W. *Grundriss der Kolloidchemie*, 6 Auflage. [Outlines of colloid chemistry, 6th ed.] Fasc. 1. 330 p. Th. Steinkopf: Leipzig, 1921.

1399. OSTWALD, W. *Kleines Praktikum der Kolloidchemie*. 2 Auflage. [Practical colloid chemistry. 2nd ed.] 159 p. Th. Steinkopf: Leipzig, 1921.

1400. SVEDBERG, T. *The formation of colloids*. viii + 127 p., 22 fig. J. and A. Churchill: London, 1921.

DIFFUSION, PERMEABILITY, PHYSICO-CHEMICAL PHENOMENA

1401. CHURCHMAN, JOHN W. *The selective bacteriostatic activity of sulfanilic acid*. Proc. Soc. Exp. Biol. and Med. 19: 317-318. 1922.—The sulfonic acid groups in acid-fuchsin are responsible for its ability to kill gram-negative organisms while sparing gram-positive aerobes. This affords data for determining the cause of the difference between these 2 types of organisms.—*M. M. Brooks.*

1402. DAHLBLOM, TH. *Osmotiska Trycket i Vattenlösningar och dess Betydelse en Disso-ciation och Lösighet*. [Osmotic pressure in aqueous solutions and its importance to ionization and solubility.] 53 p. Nordisk Rotogravyr: Stockholm, 1921.

1403. DOERR, R. *Kolloidchemische Wirkungen der Salze seltener Erden und ihre Beziehungen zu den Flockungsreaktionen der Antikörper.* [Colloid chemical action of the salts of the rare earths and their relation to the flocculation of antibodies.] *Kolloid Zeitschr.* 27: 277-292. 1920.—Salts of the rare earths (Th, Ce, Pr, and La) agglutinate suspensions of red blood corpuscles, bacteria, and fungous spores, and precipitate protein solutions even when the salt is not in the colloidal condition nor hydrolytically dissociated in solution. This occurs even in very dilute solutions (1 part thorium sulphate in 5,000-10,000 parts of the reaction mixture). Although Th with a valence of 4 is more active than La, Ce, or Pr with 3, the flocculating power is not dependent alone upon the valence but varies with unknown properties of the rare earth and of the protein. These salts are toxic for all protoplasm, but the mechanism is not a simple protein precipitation, for the precipitation is reversible in an excess of protein, whereas the poisoning is not. Spores of bacteria and fungi are not affected because of their impermeable membranes, their agglutination thus appearing to be a surface phenomenon. Protein precipitation is inhibited by an excess of either reactant, there is a minimal salt concentration below which flocculation does not occur, and this varies with the rare earth employed, being lowest for Th. Flocculation depends upon a weak union of protein and salt, as in flocculation with the heavy metals, the complex formed being colloid chemically inactive, easily reversible, dissolves quickly and completely in an excess of either protein or salt and the solvent action is proportional to the precipitating action. An analysis of the flocculant with Lowe's interferometer shows that the amount necessarily depends not only on the relative concentrations but also on the cation of the salt and is 3 times as great with a unit weight of Th as with 20 times this weight of cerium chloride. In many ways immune precipitation resembles protein precipitation by Th and Ce. It shows the same dependence upon the concentration of the reaction components, is prevented by an excess of one component, and is characterized by reversibility of the reaction product. The interferometer shows that the precipitate contains all the material lost from the solution, whether the precipitation was immune precipitation or that produced by rare earths, and this renders the conception of fermentative processes of the protein antigen unnecessary to account for the immune precipitate.—*H. E. Pulling.*

1404. GIRARD, PIERRE, W. MESTREZAT, et V. MORAX. *Recherches expérimentales sur la perméabilité des tissus vivants aux ions.* [Experimental studies on the permeability of living tissues to ions.] *Compt. Rend. Soc. Biol.* 87: 69-72. 1922.—This paper deals entirely with theoretical considerations of the selective permeability of the cell wall to ions.—*S. Morgulis.*

1405. HOOKER, MARION O., und M. H. FISCHER. *Ueber die Quellung und "Lösung" von Aleuron.* [Concerning the swelling and "solution" of aleurone.] *Kolloid Zeitschr.* 26: 49-58. 1920.—The natural mixture of plant proteins known as aleurone behaves in swelling and solution phenomena like the proteins previously investigated,—gelatin, fibrin, blood serum, and gluten. The degree of swelling does not run parallel to the concentration of the H ion nor of the OH ion, although acids and alkalies induce aleurone to swell more than does pure water alone. Neutralization does not stop swelling although the addition of neutral salts does. Swelling and solution are not the same although they often occur together and operate in the same direction.—*H. E. Pulling.*

1406. MONTFORT, C. *Die aktive Wurzelsaugung aus Hochmoorwasser im Laboratorium und am Standort und die Frage seiner Giftwirkung.* Eine induktive ökologische Untersuchung. [Active root absorption from bog water in the laboratory and in the field, and the question of its toxicity. An inductive ecological investigation.] *Jahrb. Wiss. Bot.* 60: 184-255. 1921.—The main thesis of this paper is that although bog water used in the laboratory does have a toxic effect on roots, Schimper's hypothesis of "physiological drought" in bogs must be either abandoned or greatly modified. Attention is called to the fact that some hydrophytes do occur in bogs and experiments are described indicating that bog plants absorb water readily from the bog substratum. The author used guttation and bleeding phenomena as a

measure of water absorption by roots. The validity of this method has been tested and reported [Jahrb. Wiss. Bot. 59: 467-524. 1920]. Seedlings of *Zea Mays* were placed in "sphagnum water" and in "secondary peat water," also bog plants (Hochmoorpflanzen) were placed in bog water (Sphagnum-Wasser der Rhizosphäre) each being covered with a moist bell jar. *Zea Mays* absorbed water more readily from sphagnum water and secondary peat water than from a nutrient solution or from tap water, though the difference regarding tap water disappears with time. The initial increase is greater in secondary peat water than in sphagnum water. Experiments with distilled water show that this increase as compared with nutrient solutions and tap water cannot rest solely on low osmotic pressure in the bathing medium. This action is not specific for acid bog water, since it is found also in the pit water from lignite coal which is chemically similar to "Flachmoor" water. Guttation and bleeding continued for weeks in bog plants in the laboratory in sphagnum water. Water loss is possible only with a corresponding rate of intake of water through the roots. When this rate of intake is decreased osmotically the giving off of water ceases.—Bog plants in secondary peat water first show an increase in the rate of water intake. The second stage of toxicity, the decrease in the rate of water intake, in this medium is reached earlier in *Eriophorum vaginatum* (a bog plant) than in *Zea Mays*. Bleeding of bog plants is stopped after 7 days in strong peat extract, while in sphagnum water both guttation and bleeding still continue. When plants in peat water have stopped bleeding they can be caused to bleed again by adding distilled water. A strong extract of the peat water used in these experiments is unquestionably toxic, while field observations indicated that the natural soil water bathing the roots of *Eriophorum* is not.—In the field work typical bog plants of the 3 ecological classes (hydrophytes, mesophytes, and xerophytes) were investigated in bogs in various localities and at different elevations. In primary raised bogs guttation occurred in all of the plants investigated except *Andromeda*, *Scirpus*, and *Juncus*. These bled only when the leaves were cut. *Eriophorum*, *Scheuchzeria*, and *Juncus* also show that water loss is not slower in the field than in the laboratory, and that such loss is dependent merely on the rate of water intake.—In secondary bogs the physical properties of the soil exert on the plants an influence that may be called "physiological drought" comparable to high osmotic pressure of the soil solution, but really independent of the chemical character of the water. Here it is a complex of soil factors that is important.—Even relatively weak bog water has a serious toxic effect on the root system of *Zea Mays* and other non-bog plants, the injuries being diverse; but those changes do not necessarily go hand in hand with the second stage of toxicity—the decrease in water absorption. The absorbing cells were living even when the growing tip was dead.—The roots of bog plants develop normally in bog water. Root hairs are not formed on roots that penetrated deep into the sphagnetum; but where formed, they show little or no toxic effects and their absence cannot be regarded as a symptom of toxicity. Normal root hairs develop in the drained peat of secondary raised bogs. Far-reaching conclusions on the ecology of bog plants cannot be drawn from observations on non-bog plants.—The author agrees with many of the American workers (Livingston, Transeau, Dachnowski, Rigg) as to the toxic effect of bog water and soil on the growth of non-bog plants, but conclusions cannot be drawn from these as to the behavior of bog plants in bogs. In relation to the ecology of bog plants there is an essential distinction between the physiological-ecological and the physico-chemical investigations of the American workers. The former have been somewhat misleading, while the latter have contributed much to an understanding of the complex of soil factors in bogs.—G. B. Rigg.

1407. NEUSCHLOSS, S. M. Untersuchungen über antagonistische Wirkungen zwischen Ionen gleicher Ladung. [The antagonistic action of ions of equal electric charge.] Kolloid Zeitschr. 27: 292-306. 1920.—The chlorides of alkalis, alkaline earths, and aluminum increase the surface tension of lecithin hydrosols, and by continued addition of salt the surface tension reaches a maximum. The same salts retard the action of invertase on cane sugar, and the greater the concentration of the salt or the valence of the cation the greater is the effect. The influence of salt on fermentation is paralleled by its effect on the dispersion of the ferment solution. Both processes are well represented by the adsorption isotherm. This leads to the belief that inhibition of ferment action by neutral salts is produced by diminishing the active

surface of the ferment. In all processes mentioned above, mixtures of the salts plainly exhibit antagonism. The surface tension of lecithin solutions, the inhibition of ferment action, and the surface tension of the ferment solution are chiefly, if not entirely, dependent upon the relative concentration of the cations present and independent, within wide limits, of the absolute concentration. The physico-chemical basis of the ion-antagonism lies in the ability of cations to force each other from their adsorption complexes into the surface of the colloid particles. This antagonism alters slightly the coefficient K of the adsorption isotherm which reaches its maximal value with maximum antagonism. The relative amounts at which the salts are maximally antagonistic is uniquely dependent on the valence of the cation. With cations of equal valence the ratio is 1:1; with one twice that of the other the ratio is 1:20; three times, 1:100. The only exception is when sodium and potassium salts act on the surface tension of lecithin solutions; in such an experiment the maximal action occurs not with the ratio Na:K = 1:1 but 1:20. Another maximum is found when the concentrations are in the ratio K:Na = 1:20. For this no explanation has been found.—*H. E. Pulling.*

1408. NEWTON, ROBERT, and ROSS AIKEN GORTNER. A method for the estimation of the hydrophilic colloid content of expressed plant-tissue fluids. *Proc. Soc. Exp. Biol., and Med.* 19: 356. 1922.—This method is based primarily on freezing-point determinations.—*M. M. Brooks.*

1409. PRIESTLEY, J. H., and DOROTHY ARMSTEAD. Physiological studies in plant anatomy. II. The physiological relation of the surrounding tissue to the xylem and its contents. *New Phytol.* 21: 62-80. 1922.—“At any moment certain cells around the vascular strand and within the vascular cylinder have especially permeable protoplasts: in some cases these protoplasts would seem to be more readily permeable by acid or basic ions.” If in *Vicia Faba* weak solutions of acid dyes (acid green or light green F. S.) are drawn up the xylem vessel of the root, certain cells of the pericycle, especially those just opposite the protoxylem, will be stained. On the other hand, basic dyes (malachite green) will stain the protoplasts of cells immediately adjacent to the xylem.—Under suitable conditions exudation pressures can be exhibited by stems and leaves as well as by roots (*Helianthus*, *Syringa*, *Ribes*, and *Spiraea*). Failure to obtain evidence of exudation pressure in the leafy twigs of *Fuchsia* is due to leakage from the hydathodes at the ends of veins, since blocking these permits the development of the exudation pressure. “The solutes present in the xylem sap are both organic and inorganic. As the organic solutes fell off in quantity in the sap rising from a cut vine [*Vitis*], the exudation pressure began to fail whilst the supply of inorganic solutes still remained approximately constant. Organic solutes would thus seem to be more directly responsible for the osmotic pressure effective in causing the flow of sap.”—Hydathode water of *Colocasia antiquorum* (Schott) is practically free from solute, probably due both to physical adsorption and to physiological absorption during the upward passage of the sap. The author observed such change in concentration of a fluid after it had been drawn through the stem of *Platanus*, *Ulmus*, *Syringa*, *Aesculus*, and *Acer*.—“The conception is developed of an equilibrium concentration for a sugar solution which would neither lose nor gain sugar during its passage through the xylem. This equilibrium concentration would vary in the same plant at different seasons,” being highest when the leaf buds are bursting.—*I. F. Lewis*

1410. REICHEL, H. Zur Wasser- und Ionenverteilung im Organismus. [Water and ion distribution in the organism.] *Biochem. Zeitschr.* 127: 322-326. 1922.—This is a critique and discussion of the physico-chemical aspects of the subject, with an account of an experiment with horse serum, tending to show that the change in indicator color (methyl orange) in acid protein solutions effected by addition of neutral salts does not controvert the idea that the colloid phase of the cell contents is salt-free and poor in H_2O , but that proper interpretation supports that view.—*W. W. Bonns.*

1411. STILES, WALTER. Permeability. *New Phytol.* 20: 137-149, 185-194. *Fig. 8.* 1921; 21: 1-14, 49-57, 140-162. *Fig. 4-6.* 1922.—Among the matters treated in Chapter 4 are: the

laws of diffusion, with equations for determining diffusion coefficients; methods used; a brief table of coefficients of diffusion of electrolytes and non-electrolytes; their relation to electrical conductivity and to molecular size; the influence of concentration and of temperature; and diffusion in heterogeneous systems and through colloids.—Chapter 5 is devoted to the permeability of non-living membranes. Differential permeability is discussed in some detail, along with the theories to account for the facts.—Chapter 6 deals with osmotic pressure: its determination, relation to temperature and concentration and measured values in sucrose; electrolytes and colloids; theories of osmotic pressure; and negative osmosis and its explanation.—Chapter 7 deals with the structure and composition of the cell wall, and with semi-permeable cell walls.—Chapter 8 is devoted to the plasma membrane. The 5 lines of evidence for its existence are considered: the physical laws of surfaces, cytological observations, the water relations of the cell, selective permeability and allied phenomena, and electrical conductivity. The composition of the limiting protoplasmic layer and the thickness of the plasma membrane also receive attention. Other cell membranes are mentioned.—*I. F. Lewis.*

1412. VERZAR, F., und R. BECK. Die Änderung der Aussalzbareit von Bakterien der Typhusgruppe durch verschiedene Verhältnisse. [The salting out of bacteria of the typhus group as affected by various means.] *Biochem. Zeitschr.* 107: 81-97. 1920.—Cultivation of bacteria of the typhus and para-typhus groups in agglutinin-containing bouillon failed to induce a spontaneously agglutinating type or to increase the sensitivity to sodium chloride or ammonium sulphate. Only a decrease in agglutinability resulted from cultivation in immune serum, the decrease being less in concentrated than in dilute serum for typhus bacilli, but considerable in the case of para-typhus B bacilli grown in concentrated serum. A manifold difference was shown between salting out by ammonium sulphate and agglutination by specific agglutinins.—*H. D. Hooker, Jr.*

1413. WINSLOW, C. E. A., and I. S. FALK. Studies on salt action. IV. The mutual influence of acidity and salt concentration upon bacteria. *Proc. Soc. Exp. Biol. and Med.* 19: 311-314. 1922.—In adjusting the H-ion concentration of 1.0 isotonic CaCl_2 solution and 5.0 isotonic NaCl solution it was found that neither CaCl_2 nor NaCl was toxic to *Bact. communis* between pH 5.0 and 7.0.—*M. M. Brooks.*

1414. ZSIGMONDY, R. Ueber "Lösungstheorie" und "Suspensions-theorie." [Concerning the "solution" and the "suspension" theories.] *Kolloid Zeitschr.* 26: 1-10. 1920.—This is a discussion of the grounds for the distinction between "solution" and "suspension" as used in colloid chemistry. Neither word can be dropped and neither tells the whole story. Crystalloidal and colloidal solutions or suspensions are parts of a common group; to use only 1 word for both would be like saying, "Green is red but of shorter wave length."—*H. E. Pulling.*

WATER RELATIONS

1415. GORTNER, ROSS AIKEN, and WALTER F. HOFFMAN. A rapid method for the determination of the moisture content of expressed plant-tissue fluids. *Proc. Soc. Exp. Biol. and Med.* 19: 355. 1922.—The moisture content of expressed plant saps can be measured by determining the refractive index of the sap, using an Abbé refractometer provided with a special "sugar scale." The method is accurate and rapid.—*M. M. Brooks.*

1416. MANGHAM, SYDNEY. Transport of organic substances in plants. *Nature* 109: 476-477. 1922.—The author protests the summary dismissal of transportation by bast, as suggested by Dixon and Ball [see Bot. Absts. 11, Entry 4633]. Citations of various papers and experiments are included.—*O. A. Stevens.*

1417. MENDIOLA, N. B. Effect of different rates of transpiration on the dry weight and ash content of the tobacco plant. *Philippine Jour. Sci.* 20: 639-655. 1922.—The study of plants grown in water culture shows that there is no absolute correlation between the percentage of ash, the relative rates of transpiration, and the total dry matter.—*E. D. Merrill.*

MINERAL NUTRIENTS

1418. ARMSTRONG, GEORGE M. Studies in the physiology of the fungi. XIV. Sulphur nutrition: the use of thiosulphate as influenced by hydrogen-ion concentration. Ann. Missouri Bot. Gard. 8: 237-281. Fig. 1-21. 1921.—*Aspergillus niger*, *Penicillium glaucum*, and *Botrytis cinerea* have been shown to utilize the following chemicals as sources of sulphur; MgSO_4 , $\text{Na}_2\text{S}_2\text{O}_3$, MnSO_4 , KSH, KHSO_3 , $\text{K}_2\text{S}_2\text{O}_8$, KCNS, and NH_4CNS . Some growth was evidenced with K_2S . The production of H_2S , occurring except where MnSO_4 , MgSO_4 , and $\text{K}_2\text{S}_2\text{O}_8$ were used, seems not related directly to active acidity strength of the solution or relative degree of growth. The action of the fungi on $\text{Na}_2\text{S}_2\text{O}_3$ produces sulphates in the culture solution. Other forms of sulphur as end-products are H_2S , molecular sulphur, tetrathionate, and globules of sulphur sometimes found in the hyphae.—For cultures of *Aspergillus niger*, *Penicillium cyclopium*, and *Botrytis cinerea*, the ratio of thiosulphate decomposition to growth is not constant, although for some fungi this is true. Active acidity does not appear to influence the utilization of sulphur from thiosulphate.—In a modified Pfeffer's solution the reaction reverses for *Aspergillus niger* when the sugar disappears, while *Penicillium cyclopium* may cause a reversal of the reaction with sugar present in the solution. Since it has been established that reversal of the reaction may occur, it is clear that the true course of the changes which have occurred may not be obtained merely by a determination of the initial and final H-ion concentration of the fungous cultures.—S. M. Zeller.

1419. GARNER, W. W., J. E. McMURTREY, and E. C. MOSS. Sand drown, a chlorosis of tobacco and other plants resulting from magnesium deficiency. Science 56: 341-342. 1922.—This chlorosis attacks plants on sandy soil in wet seasons. Field and laboratory study has shown it to be due to lack of magnesium and it is aggravated by the presence of much sulphur. The leaf is blanched as a whole. Tests seem to show the importance of proper fertilizers but only 50 pounds of magnesium are actually needed per acre.—C. J. Lyon.

1420. GUILLAUMIN. Quelques expériences sur la fertilisation préalable des semences. [Some experiments on the preliminary fertilization of seeds.] Rev. Gén. Bot. 34: 257-263. 1922.—Experiments were made with barley and radish seed, dipping them for varying lengths of time in water and in solutions of ammonium nitrate and peptonate of gelatin. Dipping in water favored and hastened germination. The effect of dipping seed in fertilizing solutions differs with the plant used and the strength of solution employed. With 4 per cent solutions of nitrate of ammonia germination of radish seed was injured if the dip lasted 1 hour or longer. With 4 per cent peptonate of gelatin no appreciable effect was observed for the same durations of dipping.—With very weak solutions of nitrate of ammonia, germination was hastened and the yield of radishes was increased following short durations of dipping.—The peptonate of gelatin hastened the germination of barley noticeably, but it lowered the yield of radishes even with a very short interval of dipping, although increasing the production of chlorophyll.—J. C. Gilman.

1421. MAQUENNE, L., et E. DEMOUSSY. Influence des matières minérales sur la germination. [The influence of mineral materials on germination.] Ann. Sci. Agron. Française et Étrangère 38: 113-151. 1921.—Claiming that the distilled water and cultural media, such as paper, cotton, moss, ordinarily used by plant physiologists contain sufficient mineral matter to render invalid experiments as delicate as those herein reported, the authors describe their own technique. The water was twice distilled from Jena glass fitted with a quartz condenser, and kept in vessels of quartz or platinum; as media purified quartz sand and quartz tubes were used. The experiments were as follows: (1) The influence of 12 salts, used singly on germination of peas. These included the sulphates and chlorides of the alkali metals, the alkaline earth metals, also zinc, manganese, aluminum, lead, and copper. Calcium sulphate was most beneficial and copper sulphate most toxic. (2) The effect of different metals in the presence of calcium. The results show that the favorable action of calcium is considerably weakened by the presence of another salt. (3) The influence of acids on the germination of peas and wheat. Up to a concentration of 0.5 mgm. per 10 cc. the acids were favorable; be-

yond that, unfavorable. (4) The influence of salts of iron on germination. Ordinary ferrous sulphate or ferroso-ammonium sulphate was used as the ferrous, and ammonium iron alum as the ferric salt. In 1 experiment colloidal ferric oxide, prepared by dialysis of the chloride, was used. It was found that ferrous salts are much more toxic than either the ferric salts or colloidal ferric oxide, the latter giving slightly better growth than the ferric salt. Calcium sulphate was antitoxic to ferrous salts and, reciprocally, ferrous sulphate decreased the beneficial effect of calcium sulphate.—Extensive experiments with copper sulphate are reported. Employing a very sensitive colorimetric method, copper was found to be present in a great number of soil samples of diverse origin, arable soils containing ordinarily not more than 10 mgm. per kgm; soils from vineyards ran exceptionally high, some as much as 200–300 kgm. of metallic copper per hectare,—12–14 cm. deep,—these excessive amounts being due to long continued use of copper fungicides. Practical experience shows that this large amount is not toxic but, on the contrary, is probably antitoxic.—Copper was also found to be present in various parts of all of a number of species of plants examined; and since it prevails especially in parts of greatest growth activity it is considered indispensable to protoplasm.—With peas CaSO_4 is antitoxic for CuSO_4 and the latter antitoxic for iron salts. The last mentioned result is ascribed to the oxidative (catalytic) action of copper, since infinitesimal amounts sufficed to accelerate the oxidation of iron and render it insoluble or colloidal.—A. B. Beaumont.

1422. MEVIUS, WALTER. Beiträge zur Physiologie "kalkfeindlicher" Gewächse. [The physiology of calciphobous plants.] Jahrb. Wiss. Bot. 60: 147–183. 1921.—No harmful effects due directly to calcium were noted upon the growth of *Sphagnum rufescens*, *S. fimbriatum*, *S. imbricatum*, and *S. quinquefolium*. CaCO_3 caused injury and death of *Sphagnum* because of its alkaline reaction. When the free alkali is neutralized no such injury occurs. Phosphates caused injury, but their poisonous action could be corrected by KNO_3 and MgSO_4 . Calcium was found to be unquestionably necessary for the growth of *Pinus Pinaster* and *Sarothamnus scoparius*; the lack of calcium caused the roots of the latter to rot, and it resulted in shoot-tip injury to the former. The behavior of both these plants toward OH ions was similar to that of *Sphagnum*. In strong concentrations these ions caused a great decrease in growth and a destruction of roots in both plants. Weak concentrations caused chlorosis. The concentrations causing definite injury were different for each species.—A bibliography of 62 titles is appended.—Earl S. Johnston.

1423. MUENSCHER, WALTER C. The effect of transpiration on the absorption of salts by plants. Amer. Jour. Bot. 9: 311–329. 1922.—Previous work on this subject is outlined and the many contradictory results and conclusions noted. The author studied transpiration in a pure line of barley, grown in Knop's solution in a greenhouse, one series of experiments being conducted in the summer and another in the winter. Cultures were grown for 5 weeks, the solution being changed every 5th day. Green weight, dry weight, and ash weight for tops and roots were determined. In the summer series the rate of transpiration was modified by changing humidity and light, plants being grown under 4 conditions, namely, in a dry chamber, in a humid chamber, in the sunlight, and under a shade tent. In the winter series, transpiration was modified by shading and by changing the concentration of the solution, plants being grown under 3 conditions, as follows: in sunlight in dilute solution, under a shade tent in dilute solution, and in sunlight in concentrated solution. When transpiration was reduced to less than half by increasing humidity, total ash content of plants remained essentially the same. Shading reduced transpiration but reduced photosynthetic activity also, and therefore total ash content. Increased concentration of nutrient solution reduced transpiration markedly but ash content hardly at all. The ash content expressed in percentage of total dry weight of the whole plants varied but slightly, regardless of whether the plants were grown under conditions of high or of low transpiration and irrespective of how transpiration was reduced. These results show that there is little or no relation between transpiration and absorption of salts in barley and they do not support the theory that transpiration plays an important rôle in supplying the plant with nutrient salts. The amount of growth seems to be an important factor in determining the amount and rate of entrance of essential salts taken up.—E. W. Sinnott.

1424. TRUOG, E. The feeding power of plants. *Science* 56: 294-298. 1922.—It has been proved that roots do not make mineral nutrients available primarily by acid excretion nor by the acid condition of the root hairs in contact with the soil. If 2 soluble products are formed by the excreted carbonic acid, the utilization is dependent upon the removal of these products. Plants with a high calcium content utilize rock phosphate because they remove the phosphate and calcium bicarbonate. Similar explanations may be given for the use of calcium, potassium, and base-forming elements, such use being related to sap acidity.—C. J. Lyon.

1425. WESTER, D. H. Over het mangengehalte von bloemen. [The manganese content of flowers.] *Pharm. Weekblad* 59: 51-55. 1922.—The flowers of 34 species of plants were examined and it was found that the moisture of the petals varies between 75.6 per cent in *Senecio Jacobaea* and 94.5 per cent in *Clivia*; generally 80-90 per cent of moisture is present. The smallest amount of ash was found in the petals of *Rhododendron* and the highest in the petals of chervil. The ash usually amounts to 1 per cent in the petals of flowers. All the flowers contained manganese, from 0.92 mgm. in 100 gm. of dry petals in *Weigelia* to 14.5 mgm. in *Melampyrum*. Expressed in mgm. of Mn in 100 gm. of ash the lowest amount, 11.2 mgm., was found in *Lamium* and the highest, 222.1 mgm., in *Centaurea*.—H. Engelhardt.

1426. WINSLOW, C. E. A., and MARGARET HOTCHKISS. Studies on salt action. V. The influence of various salts upon bacterial growth. *Proc. Soc. Exp. Biol. and Med.* 19: 314-315. 1922.—The effects of the addition of various salts to peptone solution containing *Bact. communis* were studied. It was found that there is a definitely stimulating action exerted by concentrations of salts below the inhibitive level.—M. M. Brooks.

1427. WRANGELL, M. VON. Gesetzmässigkeiten bei der Phosphorsäureernährung der Pflanze. [The laws governing the phosphorus nutrition of plants.] *Landw. Jahrb.* 57: 1-78. 1922.—As a result of a detailed study of the influence of phosphatic fertilizers on plant growth the author comes to the following conclusions: (1) Different plants do not utilize alike the difficultly soluble calcium phosphates. (2) The calcium-loving plants are able to utilize phosphoric acid from difficultly soluble calcium phosphates (raw phosphate, tricalcium phosphate) even when the reaction is weakly alkaline. The presence of moderate quantities of alkaline or physiologically alkaline calcium salts prevents appreciably the high calcium consumption of these plants, but not the utilization of the calcium phosphate. Other plants, particularly cereals, utilize difficultly soluble calcium phosphates only in the presence of acid manures, or when the soil reaction is acid. With manures reacting alkaline, and in the presence of lime, the acidity of the soil is diminished and the utilization of calcium phosphates ceases completely. (3) The ratio $\text{CaO} : \text{P}_2\text{O}_5$ in the ash of these plant groups is distinctly different. In the cereals, the calcium-phosphoric acid factor (ratio of molecular $\text{CaO} : \text{molecular P}_2\text{O}_5$) is, on the average, 1 to 3; in the calcium-loving plants (Cruciferae, beets, flax, buckwheat), the ratio is much larger, on the average 15. This factor indicates the ability of various plants to utilize difficultly soluble calcium phosphates. (4) The greater the calcium consumption of plants, the longer is the absorption of phosphoric acid from calcium phosphate prevented by the presence of calcium salts. Cereals containing normally, in the ash, less calcium in relation to P_2O_5 than would correspond to the formula $\text{Ca}_3(\text{PO}_4)_2$, can utilize the latter only in the absence of other calcium salts. In the presence of 1 molecule of CaCO_3 for 1 molecule $\text{Ca}_3(\text{PO}_4)_2$, the yield of oats diminished to $\frac{1}{2}$; with 2 molecules CaCO_3 , to $\frac{1}{3}$; in the presence of 5 molecules of CaCO_3 , the $\text{Ca}_3(\text{PO}_4)_2$ was not utilized at all. This drop in the utilization of $\text{Ca}_3(\text{PO}_4)_2$ by increasing the amount of CaCO_3 , was much slower in the case of buckwheat. Only in the presence of 600 molecules of CaCO_3 had the calcium-phosphoric acid ratio reached a maximum, and the action of $\text{Ca}_3(\text{PO}_4)_2$ ceased completely. The ability of plants to assimilate calcium is in a way a measure of the calcium-phosphoric acid factor. (5) In the presence of pure $\text{Ca}_3(\text{PO}_4)_2$ in neutral, calcium-free sand, white mustard will suffer from lack of calcium, while corn will suffer from lack of phosphoric acid, as seen from the ash analyses. White mustard gives, under these conditions, a relatively high P_2O_5 content with a low calcium content (factor 7 instead of the normal factor 15). Corn shows a low P_2O_5 and a high Ca content (factor 16

in comparison with the normal 3). The calcium-phosphoric acid factor can serve as an index of the conditions under which plant nutrition takes place, giving information on the soil reaction, $\text{Ca}:\text{P}_2\text{O}_5$ ratio in the soil, degree of activity of these substances, etc. (6) Pot experiments as well as practical field conditions may in some cases show a lack in a certain nutrient, while the soil itself may actually not need this nutrient. This may be due to the other fertilizers used, soil reaction, and presence of an abundance of lime. (7) The sensitiveness of lupines towards calcium can be overcome by an excess of P_2O_5 fertilization. (8) In general an acid reaction in the soil favors an anion assimilation, while an alkaline reaction favors an assimilation of cations. (9) In the presence of soluble phosphates, particularly acid phosphates, there is abundant development of the green flagellated alga *Haematococcus pluvialis*, on the surface of the sand; in the absence of P_2O_5 , there is a development of the red palmella form of the same species; in the presence of difficultly soluble phosphates with reaction acid, or CaHPO_4 with reaction alkaline, both the red and green forms or mixed forms develop side by side. (10) The utilization of tertiary aluminum and iron phosphates by different plants is not dependent on the presence of calcium and its action. These phosphates are utilized relatively well, specially magnesium phosphate. (11) The question of the kind of base in phosphatic fertilizers is important. The utilization of the phosphates Ca, Al, Fe, and Mg depends on the preference of the individual plants for the corresponding base.—*Selman A. Waksman*.

PHOTOSYNTHESIS

1428. BALLY, E. C. C. Photosynthesis. *Nature* 109: 344-346. 1922.—All chemical reactions are considered to take place in 3 stages: (1) changing the molecules from an inactive state into the reactive condition, either by a catalyst or by absorption of radiant energy; (2) the actual atomic rearrangements by which the new compounds are formed; (3) the changing of the resulting molecules into the normal inactive state. The energy used in stage 1 may be greater than that evolved in 2 and 3 (endothermic reaction) or less (exothermic reaction). Highly endothermic reactions, such as the production of formaldehyde from carbon dioxide and water, require so much energy that as a practical laboratory method heat energy cannot be used, while ultra-violet light of 200 micromillimeters wave length can be. Basic dye stuffs, as malachite green, methyl orange, or *p*-nitrosodimethylaniline, in a solution of carbon dioxide will act in ordinary daylight as photocatalysts in producing formaldehyde; and chlorophyll in plants seems to act in this manner. The formaldehyde thus produced, being in a reactive condition, does not require added energy to activate it; and since it has been shown that formaldehyde in this condition will polymerise to a reducing sugar, it is believed that this accounts for sugar production in leaves and the lack of free formaldehyde. As for the oxygen, "it is in the highest degree probable that a molecule of chlorophyll *a* combines with a molecule of carbonic acid, and this complex on exposure to light gives a molecule of activated formaldehyde and a molecule of chlorophyll *b*, which by another mechanism in the leaf is changed back to the *a* form, thus releasing a molecule of oxygen. It is further suggested that carotin has the power of reducing chlorophyll *b* to chlorophyll *a*, being itself oxidized to xanthophyll," since the ratio of xanthophyll to carotin increases during photosynthesis. The 2 latter pigments may absorb sufficient energy to cause the evolution of oxygen. The sugars produced from activated formaldehyde are all hexoses which thus seem to be the starting point for the synthesis of other plant products. Further, activated formaldehyde will combine with potassium nitrate or nitrite in aqueous solution in ultra-violet light, and when in excess both sugars and the form-hydroxamic acid are formed independently. This is suggested as the condition in plants. Ammonia also combines readily with activated formaldehyde. "Finally, one very important deduction may be made. The sole photosynthetic process in the living plant would seem to be the production of activated formaldehyde from carbon dioxide and water" and all other processes are essentially polymerisations or chemical syntheses.—*Ernest Shaw Reynolds*.

1429. BALLY, E. C. C., I. M. HEILBRON, and D. P. HUDSON. Photocatalysis. Part II. The photosynthesis of nitrogen compounds from nitrates and carbon dioxide. *Jour. Chem. Soc. [London]* 121: 1078-1088. 1922.—This is a discussion of the formation of the complex nitrogen

derivatives in plants, based on experiments in which nitrogen compounds were synthesized in vitro from carbon dioxide and potassium nitrate. The activated formaldehyde, photo-catalytically formed in leaves from carbonic acid through the agency of chlorophyll, reacts with potassium nitrite to produce form-hydroxamic acid, the 1st step in the synthesis of nitrogen compounds in plant tissue. Form-hydroxamic acid reacts with additional activated formaldehyde producing more complex nitrogen-containing substances known to occur in plants, e.g., amino-acids, alkaloids, etc. Any excess of activated formaldehyde condenses to hexoses (but not to pentoses). In these various nitrogen reactions oxygen is evolved. It is believed that nitrogen synthesis takes place exclusively in leaves, and that the products are transported as soluble glucosides. These results explain the observations of Schimper [Bot. Zeitg. 46: 65. 1888] to the effect that nitrites are always present in the leaf in the dark and that they disappear when the leaf is exposed to light. The activated formaldehyde formed in the light reacts with the nitrites, forming other nitrogen compounds. It is suggested that catalase is involved in the reduction of nitrate to nitrite. Readiness of reaction in these syntheses is explained by the highly activated condition of the compounds. "The key to the problem is the enhanced reactivity of freshly synthesized molecules."—*F. E. Denny.*

1430. WARBURG, O. Über die Geschwindigkeit der photochemischen Kohlensäureversetzung in lebenden Zellen. II. [The velocity of the photochemical decomposition of carbon dioxide in living cells.] Biochem. Zeitschr. 103: 188-217. Fig. 1-3. 1920.—When a dark-adapted green cell was illuminated at low intensity, no photochemical induction was detected; when illuminated at high intensity, the velocity of carbon assimilation increased in a few minutes to a constant end value. When a light-adapted cell was darkened, assimilatory activity diminished gradually and dark equilibrium was reached in 5 minutes. Narcotics affected carbon assimilation at low concentrations of CO₂ in the same manner as at high concentrations. Hydrogen cyanide retarded the photochemical cleavage of oxygen from CO₂ but not from intermediary products of respiration. Assimilation is thought to consist of 3 photochemical processes. The primary reaction affects chlorophyll but does not lead to the formation of oxygen. Another is the formation of acceptors from carbon dioxide, an irreversible reaction retarded by small amounts of hydrogen cyanide. Finally, the products of the 1st reaction react with the acceptors, a reaction not affected by hydrogen cyanide. Experiments on the photochemical reduction of nitrate in the absence of CO₂ failed to show whether the nitric acid was reduced directly or whether it reacted with cell constituents and the oxygen was produced in the same manner as during assimilation.—*H. D. Hooker, Jr.*

METABOLISM (GENERAL)

1431. ARNOLD, W. Zur Bestimmung von Fettsäuren auf Grund ihrer Flüchtigkeit mit Wasserdämpfen. [Estimation of fatty acids by means of their volatility with steam.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 345-372. 1921.

1432. BELL, MARION, and LAFAYETTE B. MENDEL. The distribution of vitamin-B in the wheat kernel. Proc. Soc. Exp. Biol. and Med. 19: 395. 1922.—Various percentages of wheat and wheat derivatives were fed to mice. From 14 to 40 per cent of the entire wheat kernel as a source of vitamin-B was required to insure normal rate of growth. Various parts of the grain itself were analyzed for the presence of vitamin-B.—*M. M. Brooks.*

1433. CIAMICIAN, G., and A. GALEZZI. Sul contegno di alcune sostanze organiche nei vegetali. [Upon the behavior of some organic compounds in plants.] Gazz. Chim. Ital. 52: 3-20. 1922.—The paper is divided into 3 parts: I. The attack of uric, dimethyluric, salicylic, *m*-cresylic, tetra-hydrophthalic, carboxypyrrolic, di-methyl-pyrrol-di-carbonic, phthalic acids, methyl salicylate, α -naphthylamine, pyridine, quinoline, urea, guanidine, eugenol, vanylline of benzilic acid and alcohol by the pulp of *Spinacia oleracea* in oxygen and toluol. II. A study of the attack of glucosides by the leaves of the cherry laurel and *Spinacia*. The following substances were studied: amygdaline, salicine, saligenine, tannin, and pyrogallol.

III. A study of the effect of xanthine, theobromine, caffeine, compound esters (diethyl oxalate and succinate vs. the K salts), monovalent alcohols (methyl, ethyl, propyl, isopropyl, isobutyl, isoamyl) aldehydes (formic, acetic, and propionic), ketones, and oxyacids upon the growing plant of *Phaseolus*. The technique has been previously described. [See also Bot. Absts. 5, Entry 2240; 6, Entry 1317; 7, Entries 2133, 2134; 10, Entries 1341, 1342, 1361].—A. Bonazzi.

1434. COLIN, H. L'inuline dans les plantes greffées. La greffe soleil annuel-Topinambour. [Inulin in grafted plants. The sunflower-artichoke graft.] Rev. Gén. Bot. 34: 145-155, 202-213. 1922.—The graft of sunflower (*Helianthus annuus*) and artichoke (*Helianthus tuberosus*) was studied with particular regard to chemical characteristics of the sap of the grafted plants. The carbohydrates of the sunflower are saccharose and the reducing sugars, chiefly glucose; those of the artichoke are inulin and its derivatives. From chemical analyses of both autonomous plants and of grafts of sunflower on artichoke and vice-versa the author concludes that the different plants making up the graft maintain their individual identities and do not fuse either physiologically or morphologically.—J. C. Gilman.

1435. DEUSSEN, E. Die Gramsche Bakterienfärbung, ihr Wesen und ihre Bedeutung. [The nature and significance of Gram staining.] Biochem. Zeitschr. 103: 123-141. 1920.—The effect of various acids at different temperatures in rendering Gram-positive yeast Gram-negative was determined. This change, which was in proportion to the degree of dissociation of the acid, is attributed to an alteration of the cell contents. It is suggested that the tendency of acids and neutral salts to reduce and eventually to stop the fermentation of sugar by yeast may be attributed to protein precipitation within the cells. A similar effect is surmised to be produced in *Staphylococcus aureus*.—H. D. Hooker, Jr.

1436. ELIAS, H., und S. WEISS. Über die Rolle der Säure im Kohlenhydratstoffwechsel. V. Säure und Alkali in ihrer Wirkung auf den Kohlenhydratstoffwechsel der Hefezelle. [The rôle of acids in carbohydrate metabolism. V. The action of acids and alkalis upon the carbohydrate metabolism of the yeast cell.] Biochem. Zeitschr. 127: 1-12. 1922.—As a means of interpreting previous experiments on glycogen formation in liver, the writers have studied the effect of acid and alkaline solutions on the content of this carbohydrate in yeast. Methods are briefly described. The quantitative sugar data were obtained after hydrolysis by the Bertrand method. Acid solutions showed no consistent effect upon glycogen content. In alkaline solution, however, a definite increase in glycogen content was correlated with increased solution concentration up to $\frac{N}{20}$ NaOH. At greater concentrations (up to $\frac{N}{5}$) there was increase in total glycogen, most of which was present in the surrounding solution. An increase in total carbohydrate content is ground for the conclusion, supported by nitrogen determinations ("Rest" N), that increase in glycogen does not result from conversion of existing sugars, but from the clearance products of proteolysis.—W. W. Bonns.

1437. IRVINE, JAMES COLQUHON, ETTIE STEWART STEELE, and MARY ISOBEL SHANNON. The constitution of polysaccharides. Part IV. Inulin. Jour. Chem. Soc. [London] 121: 1060-1078. 1922.

1438. KENNEDY, CORNELIA, and LEROY S. PALMER. Yeast as a source of vitamine-B for the growth of rats. Proc. Soc. Exp. Biol. and Med. 19: 362-364. 1922.—Yeast was found to be a variable source of vitamin-B for growth when fed to rats because it was produced under various conditions. The results do not support the general belief that yeast is an unusually rich source of vitamin-B for growth.—M. M. Brooks.

1439. LOEWE, S. Zur physikalischen Chemie der "Lipoide." Die Durchwanderung von Methylblau durch organische Lösungen. [The physical chemistry of lipoids. The diffusion of methylene blue through organic solutions.] Biochem. Zeitschr. 127: 231-240. Fig. 1. 1922.

1440. MACDOUGAL, D. T. The probable action of lipoids in growth. *Proc. Amer. Phil. Soc.* 61: 33-52. *Fig. 1.* 1922.—Experiments performed are for the consideration of lipoids as a fundamental structure of protoplasm and the primary factor in all exchanges between the cell and the medium. Measurements of endosmose in artificial cells with a plasmatic lining including lipoids were made. The porosity of the clay walls was first determined in various ways and then the absorption capacity of lining layers of various mixtures of biocolloids measured when under the influence of salts, saponin, and soaps. Lecithin incorporated in the plasmatic jelly layer of the cell had little effect on the osmotic action, but when deposited as a layer between the plasmatic jelly and the outer wall it lessened the permeability and increased the osmotic effect. The use of saponin or solutions which liquefy or displace lecithin in the cell contents or external layer increased permeability by increasing hydration, and lessened osmotic action. The hydration reactions of living and dead cell masses in the solutions used in the osmotic tests showed a similar influence on the wall of the plant cell. Variations in thickness indicative of changes in turgidity of cell masses subjected to neutral salts and other solutions were registered by means of the auxograph.—*Wanda Weniger.*

1441. MOREAU, M. et MME. FERNAND. Étude des phénomènes sécrétoires dans les glandes à lupuline chez le houblon cultivé. [Study of the secretion of lupulin by the glands of cultivated hops.] *Rev. Gén. Bot.* 34: 193-201. *Pl. 9-10.* 1922.—During the development of the lupulin-glands, 3 groups of substances may be recognized in the cells: lipoids, tannoids, and the essences and resins. A special procedure was used in the case of the lipoids due to their solubility in alcohol, benzine, toluene, xylol, or other substances used in fixation and imbedding. During the growth of the gland the lipoids were observed in the cytoplasm in the form of granules and filaments, present from the beginning, becoming more and more abundant up to the time of the spreading of the disk and cup, then diminishing in quantity in the later stages. The tannoids on the other hand occur in the vacuoles. They are present in solution in the young stages, then appear as threads or a network, later becoming more voluminous, and they persist even in the older glands. The essences and resins were not found in the young glands, which were rich in lipoids but they became abundant in the later cup stage. These products are present in the cytoplasm between the vacuoles containing the tannoids or around the large tanniferous central vacuole, always as globules larger than the granular lipid bodies. Because of these associations the authors are inclined to consider that the essences and resins are elaborated from the lipoids or, if the relation is not so close as this, at least the lipoids react with the protoplasm to modify permeability so as to allow the passage of the essences and resins into the subcuticular cavity of the gland.—*J. C. Gilman.*

1442. NEUBERG, C. Weitere Erfahrungen über die Bildung und Bedeutung der Fructose-diphosphorsäure im Stoffwechsel der Hefe. [The formation and significance of fructose-diphosphoric acid in yeast metabolism.] *Biochem. Zeitschr.* 103: 320-335. 1920.—Since fresh bottom yeast in the presence of toluol contains no hexose diphosphate, while the same yeast when dried contains it, this compound appears, in a sense, as a pathological product of yeast metabolism. It is not considered essential to the process of fermentation, as sugar was decomposed without any indication of esterification.—*H. D. Hooker, Jr.*

1443. NORD, F. F. Phytochemische Reduktion von o-Nitrobenzaldehyd. [Phytochemical reduction of o-nitrobenzaldehyde.] *Biochem. Zeitschr.* 103: 315-319. 1920.—The action of yeast cells on ortho-nitrobenzaldehyde results in the recovery of only 10 per cent as ortho-nitro-benzylalcohol. Other reaction products are present. The phytochemical reduction of the aldehyde groups is evidently easier than that of the nitro group.—*H. D. Hooker, Jr.*

1444. PATSCHOVSKY, NORBERT. Studien über Nachweis und Lokalisierung, Verbreitung und Bedeutung der Oxalsäure im Pflanzenorganismus. [Identification and location, distribution and significance of oxalic acid in the plant.] *Dissertation.* 126 p. Jena, 1918.

1445. ROSE, MARY SWARTZ, AND GRACE MACLEOD. The almond as a source of the A vitamin. *Proc. Soc. Exp. Biol. and Med.* 19: 391-393. 1922.—When 3 per cent almond mixture

was added to the basal diet of rats, their weight increased. This shows that almonds seem to be fairly rich in fat-soluble A vitamin. Larger quantities produce unfavorable effects on growth.—*M. M. Brooks.*

1446. SAHA, HARIDAS, AND KUMUD NATH CHOUDHURY. **Capsularin, a glucoside from jute leaf.** Jour. Chem. Soc. [London] 121: 1044-1046. 1922.—The glucoside capsularin was isolated from the leaves of the jute (*Corchorus capsularis*) and was found to differ from the glucoside corchorin present in the seed of the same plant. A purified, crystalline product was obtained. On hydrolysis *d*- and *l*-glucose were split off, but the identity of the second product of hydrolysis was not established.—*F. E. Denny.*

1447. WILLAMAN, J. J., AND R. M. WEST. **Correlations among the constituents of potato tubers.** Proc. Soc. Exp. Biol. and Med. 19: 360-362. 1922.—The protein and carbohydrate found in potato tubers are not correlated with the dry matter, but are correlated with each other negatively. The amount of ether extract found in tubers is insufficient to account for all the increase in dry matter. It is possible to improve the potato tuber as regards protein, provided the dry matter is increased, thereby maintaining the mealiness which is a desirable quality.—*M. M. Brooks.*

1448. WISLICENUS, H. **Die Kolloidchemie des Holzes, seiner Bestandteile und seiner Entstehung.** [The colloid chemistry of wood, its components and its formation.] Kolloid Zeitschr. 27: 209-223. 1920.—Ordinary chemistry, although showing the method by which even the large molecules of tannins, fats, and resins may be formed from the simpler photo-synthetic products, fails to explain lignification. Although cellulose is constant in composition, with the formula $(C_6H_{10}O_5)_x$ (x being large) lignin has a carbon content varying from less than 52.5 to over 65.0 per cent; hydrogen ranges from 5.3 to 4.8 per cent; while oxygen and nitrogen together range from 30.2 to 42.2 per cent. Klason's formula $(C_{40}H_{42}O_{11})$ really applies to an aromatic component of lignin. The stainable substances in lignified wood are not lignin. Lignin is the sum of all colloiddally dissolved hydrosols of high molecular weight that are deposited from the formative or cambial sap upon the surface of cellulose fibers. Anatomical variability of tissues and vessels of woody plants is not very great and depends upon differences in surface structure, i. e., upon the variability of lignin, and on it also depend the properties, density, etc., of wood.—The author's hypothesis involves many considerations, thus (1) an increasing complexity of sap compounds as the leaf activity proceeds, also the transportation and concentration of these in the older cells as oxidation and condensation products; (2) the ascending transpiration stream, laden with salts, etc., meeting the stream of assimilate and inducing coagulations and other colloid chemical effects; and (3) the indifferent hydrosols being coagulated by the multivalent ions, the acid substances with high molecular weight forming alkali salts and thus acquiring greater dispersion and dissemination.—The author then used cambial sap and spring root sap in testing for strongly dispersed, weakly adsorbing substances and for those that were but slightly dispersed and were strongly adsorbent. The inner bark was peeled off with glass or porcelain and put at once into distilled water to prevent discoloration through oxidation. This was filtered and quantitative studies on adsorption were undertaken. Spring bleeding sap contains but little colloid at the beginning and from March to the end of sap flow (near May 1) shows only a slight increase—to 4.5-8.5 per cent. The hornbeam, which forms especially heavily lignified wood, had 21 per cent by May. The cambial sap from the beginning of leaf activity was, however, very rich in colloids. In May, June, and July the percentage of colloids was from 30 to 40 per cent. About the beginning of August it drops to its low point, 6.5-8.0 per cent, or about the amount in bleeding sap. About this time secondary thickening ceases and the cortex dries. At the time of maximum wood formation the colloid content of the leaf sap is the highest. When wood formation is at its minimum, the colloid content is likewise.—The pure chemistry is not clear. The chief possibilities are: (1) normal polymerization and addition by main valences; (2) molecular complex formation by sub or latent valences; (3) ordinary condensation; (4) autooxidation with following condensation; (5) independent syntheses and transformations. Examples of these various

classes are discussed from the standpoint of the application to lignification. It is possible to form a cellulose hydrosol by grinding cellulose fibers in water for a long time; upon standing this sol stiffens to a jelly. The similarity of fibrous clay in structure and in adsorption behavior to animal and plant fibers is pointed out and illustrated by photomicrographs. After its deposition various adsorptive changes take place in lignin and these are followed by slow chemical transformations and greater concentration of molecules, especially of the carbinol groups of the saccharide polyalcohols. This leads to aging, and with drying, the mass becomes so resistant that few chemical reagents are able to affect it.—*H. E. Pulling.*

METABOLISM (NITROGEN RELATIONS)

1449. FODOR, A. Studien über den Kolloidzustand der Proteine im Hefeauszug. 1. Hefesaftprotein in alkalischer Lösung. Beziehungen zu biologischen Vorgängen. [The colloidal condition of the proteins in expressed sap of yeast. 1. Yeast-sap protein in alkaline solution. The relation to biological processes.] *Kolloid Zeitschr.* 27: 58-69. 1920.—Because the enzymatic action is best in weakly alkaline solution and because there is an adsorption compound between the colloidal enzyme and its substrate, this research was undertaken as a basis for a theory of enzyme action in yeast. The ionic theory cannot explain the facts either of ferment action or of adsorption in these solutions without the help of dispersoid chemistry. The enzyme is the adsorbent to which the substrate is bound. The optimum concentration is the result of 2 opposing reactions of which one is an increase in the degree of dispersion through accumulation of OH ions, while the opposing action is produced by hydration of the enzyme particles, which thus decreases its power to adsorb substrate. The biologically active parts of peptolytic and tryptolytic enzyme systems are colloids in the state of heteroions that bear OH groups in a potential condition and which are not injured by extensive hydration and decrease in adsorbing power. Apparently the organism regulates the hydration by suitable acidity of the medium.—*H. E. Pulling.*

1450. GLÄSSNER, K. Eine neue Pepsinbestimmungs Methode. [A new method of pepsin determination.] *Biochem. Zeitschr.* 127: 312-315. 1922.—The method is based on the precipitation by dilute ammonia of globin in solution acidified by HCl.—*W. W. Bonns.*

1451. KNOWLTON, H. E. A preliminary experiment in half tree fertilization. *Proc. Amer. Soc. Hort. Sci.* 18: 148-149. 1921 [1922].—In an effort to obviate the factor of tree individuality an experiment was conducted whereby the root systems on one side of each of 25 Rome Beauty apple trees were fertilized with 5 pounds of nitrate of soda several weeks before blooming time and the other side of each left as control. At intervals after the application, samples of buds and leaves were taken from both sides of the tree. On the 5th and 8th days no noticeable differences were evident between the nitrogen content of the opening fruit buds on the 2 sides of the tree. On the 12th day the buds on the fertilized side showed 43.5 mgm. of nitrogen and on the unfertilized side 30.9 per gm. of dry weight. On the 21st day the corresponding analyses of leaves were 17.4 and 12.9 mgm. respectively. Analyses made in the fall showed no significant differences between the 2 sides. A study of terminal growths showed that limbs on the fertilized side received more nitrogen than did the unfertilized side.—*W. E. Whitehouse.*

1452. RAYNER, M. CHEVELEY. Nitrogen fixation in Ericaceae. *Bot. Gaz.* 73: 226-235. *Fig. 1-4.* 1922.—The author summarizes the investigations which furnish "cumulative evidence that the endophyte of Ericaceae can utilize atmospheric nitrogen in greater or less degree." Experimental evidence is given which supports the conclusions of Ternetz that the *Calluna-Phoma* symbiosis is an obligate one. The ericaceous plant in this instance to a significant degree obtains its nitrogen from the nitrogen-fixing fungus. This accounts for the "proved ability of a species such as *Calluna* and *Vaccinium* to thrive in soils deficient in nitrates."—*B. W. Wells.*

METABOLISM (ENZYMES, FERMENTATION)

1453. BIEDERMANN, W. Über die Wirkung von Pepsin und Trypsin auf Diastase. [The effect of pepsin and trypsin on diastase.] Biochem. Zeitschr. 127: 38-46. 1922.—These are experiments dealing with animal diastase (salivary excretions) showing that pepsin inhibits diastatic activity while trypsin does not.—W. W. Bonns.

1454. BOAS, F. Über die Abhängigkeit von Hefewachstum und Hefengärung von physikalisch-chemischen Erscheinungen. [The dependence of yeast growth and fermentation on physico-chemical processes.] Biochem. Zeitschr. 105: 193-198. 1920.—The fermenting ability of bottom yeast in 15 per cent glucose solution to which ammonium sulphate was added varied with the concentration of the latter, there being 1 maximum and 2 minimum zones, and the rate of growth showed 2 maxima and 1 minimum. Analogous results were obtained when racemic leucine, asparagin, and peptone were used as sources of nitrogen, the details varying with the strain of yeast used, but with natural leucine the carbon dioxide evolved was proportional to the concentration. The phenomena are attributed to physico-chemical changes in the plasma membrane.—H. D. Hooker, Jr.

1455. BOAS, F., H. LANGKAMMERER, und H. LEBERLE. Untersuchungen über Säurebildung bei Pilzen und Hefen. IV. [Acid formation by molds and yeasts.] Biochem. Zeitschr. 105: 199-219. 1920.—Acid formation by yeast was favored by the sugars maltose, glucose, fructose, and sucrose in increasing intensity, or inversely as they favored growth and fermentation, acid development being zero with many yeasts in maltose and very great in sucrose. The specific action of the sugar may be altered somewhat by adaptation, by the concentration of nitrogen, or by the reaction of the solution. Sucrose was inverted, but only slowly fermented. The nature of the nitrogen supply was immaterial, though with maltose ammonium chloride stimulated growth and fermentation more than asparagin. The maximum acidity attained during fermentation of sucrose was pH 2.44. In whortleberry juice with sucrose and ammonium chloride added, a pH of 1.85 was reached during vigorous fermentation, without injury to the yeast.—H. D. Hooker, Jr.

1456. HÄGGLUND, E. Schweflige Säure und Hefegärung. [Sulfurous acid and yeast fermentation.] Biochem. Zeitschr. 103: 299-305. Fig. 1-2. 1920.—The toxic action of sulfurous acid on yeast fermentation is ascribed to the undissociated molecule. Sodium sulphite also retards fermentation while potassium sulphate stimulates it, increasing it 25 per cent in a 0.2N solution.—H. D. Hooker, Jr.

1457. HEPBURN, J. S., E. Q. ST. JOHN, F. M. JONES, and W. F. BOKER. Studies of the North American Sarraceniaceae. Jour. Biol. Chem. 50: Proc. XLVI. 1922.—Liquor from closed pitchers of *Darlingtonia californica* contained diastase. Protease, maltase, emulsin, invertase, and urease were absent. Liquor from closed pitchers of *Sarracenia flava* contained invertase and lipase. Maltase, emulsin, diastase, urease, and esterase were absent. The liquor had a surface tension of 66.4 dynes per cm. Protease occurred in the fluid from closed pitchers of the Sarraceniaceae. Liquor from closed pitchers was bacterially sterile, that from open pitchers contained proteolytic bacteria. The pitchers absorbed nutrient compounds from their cavities. The pitcher liquor from the Sarraceniaceae produced permanent cessation of motion of ants and caused more of them to sink, and more promptly than in water. The rhizomes of the Sarraceniaceae did not contain protease.—G. B. Rigg.

1458. LIPPMANN, E. O. VON. Über die sogenannte Methylalkoholgärung. [Methyl alcohol fermentation.] Biochem. Zeitschr. 106: 236-238. 1920.—The presence of methyl alcohol in fermented fruit juices is attributed to the hydrolysis of pectin, a methyl ester of pectic acid, and not to any process of fermentation.—H. D. Hooker, Jr.

1459. MERL, TH., und J. DAIMER. Studien über Mehlkatalase. [Studies of the catalases of flour.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 273-290. 1921.—The behavior

of flour-catalase with trypsin is less conclusive in establishing that the former is of albuminous nature than is the case with animal catalases. A dried preparation of grain embryos (14 per cent of their original weight) possesses 5 times the catalytic power of the original material. The gas volumetric apparatus of Tillmans and Henblein was used for estimation of catalytic power. The optimum hydrogen-ion concentration extends from pH 6.2 to an alkaline reaction. The inhibitive action of acetic and lactic acids is weak. The optimum temperature is between 30 and 40°C., and the temperature coefficient of rapidity of decomposition is about 1.5. Relatively great resistance to dry heat, characteristically high susceptibility to moist heat, and a low resistance to high temperature in moist surroundings were demonstrated. In a comparison of inhibition by alcohol, benzol, chloroform, hydrocyanic acid, and toluol the last appeared least harmful.—*E. E. Stanford.*

1460. MORGULIS, S. The heat of enzyme reaction. A study of the heat produced in the catalase reaction. *Jour. Biol. Chem.* 50: Proc. XLII-XLIII. 1922.—The catalase reaction is exothermic and is accompanied by a definite heat production.—*G. B. Rigg.*

1461. NEMEC, ANTOINE, ET FRANÇOIS DUCHON. Sur la vitalité des graines et leur activité diastasique. [The vitality of seeds and their diastatic activity.] *Ann. Sci. Agron. Française et Étrangère* 38: 320-329. 1921.—Previously, it has been shown by the authors that diastatic activity diminishes with natural aging. In the researches here reported studies have been made of the activity of glycerophosphatase, lipodiatase, urease, amylase, catalase, and phytoprotease of various seeds compared with their more or less conserved vitality. The data submitted show that with some enzymes at least, the diastatic activity diminishes with increasing age of the seed. However, there are seeds which have lost their germinating capacity that still show a greatly lessened activity of certain enzymes; the activity of catalase seems to disappear almost entirely. From this the conclusion is drawn that it is the activity of catalase that represents the vitality of the seed. This relationship offers some practical possibilities for rapid detection of vitality of seeds, to be reported later by the authors.—*A. B. Beaumont.*

1462. NEUBERG, C. Die physikalisch-chemische Betrachtung der Gärungsvorgänge. [Physico-chemical consideration of fermentation.] *Biochem. Zeitschr.* 105: 306. 1920.—This is a reply to W. Ostwald [see *Bot. Absts.* 12, Entry 1468].—*H. D. Hooker, Jr.*

1463. NEUBERG, C., und MARTA EHRLICH. Über die Beziehung der phytochemisch reduzierbaren Substanzen zum Vorgange der alkoholischen Gärung und über die Natur der Aktivatorwirkung. [The effect of phytochemical reducing substances on alcoholic fermentation and the nature of the activation.] *Biochem. Zeitschr.* 101: 276-318. 1920.—Alcoholic fermentation of glucose is accelerated by naturally occurring ketones, diketones, and disulphides, as well as by aldehydes, but to a smaller degree. Phytochemical reduction seems to be correlated with the ability to stimulate alcoholic fermentation. The stimulating effect is accompanied by a reduction of the reducing group in the activator. The presence of acetaldehyde during ordinary yeast fermentation is thought to have biochemical significance.—*H. D. Hooker, Jr.*

1464. NEUBERG, C., und MARTA EHRLICH. Weiteres über die Beziehung der Aldehyde zur alkoholischen Gärung. [The effect of aldehyde on alcoholic fermentation.] *Biochem. Zeitschr.* 101: 239-275. 1920.—Experiments with 71 aldehydes show that alcoholic fermentation of glucose and mannose is furthered by the aldehyde group, the nature of the radical attached thereto having no appreciable influence. This acceleration occurs equally in fermentation by living yeast cells and in fermentation by enzyme preparations. It is shown by all manner of aldose sugars, whether they be fermentable or not.—*H. D. Hooker, Jr.*

1465. NEUBERG, C., und H. OHLE. Zur Kenntnis der Carboligase. III Mitteilung, Der Bau der biosynthetisch verknüpften mehrgliedrigen Kohlenstoffketten. [Carboligase. III contribution. The structure of the biosynthetic connected, multibranched hydrocarbon

chains.] *Biochem. Zeitschr.* 127: 327-339. 1922.—A report is made of further work with carboligase, an enzyme of yeast, in converting sugar or pyroracemic acid to phenylpyroracemic alcohol in the presence of benzaldehyde. Further treatment with organic reagents and with dilute H_2SO_4 results in a "biosynthesis" to 1-phenyl-acetyl-carbinol.—*W. W. Bonns.*

1466. NEUBERG, C., und E. REINFURTH. Ein neues Abfangverfahren und seine Anwendung auf die alkoholische Gärung. [A new procedure and its application to alcoholic fermentation.] *Biochem. Zeitschr.* 106: 281-291. 1920.—The intermediary production of acetaldehyde in alcoholic fermentation was demonstrated by the addition of dimethylcyclohexan-dione, 2 molecules of which condense with 1 of aldehyde with the elimination of 1 molecule of water. Sugars and ketones do not give the reaction. The same compound was obtained after fermentation with macerated yeast sap as with living yeast cells. Certain advantages of this procedure over the sulphite addition reaction are considered.—*H. D. Hooker, Jr.*

1467. NEUBERG, C., J. HIRSH, und E. REINFURTH. Die drei Vergärungsformen des Zuckers, ihre Zusammenhänge und Bilanz. [The three types of sugar fermentation.] *Biochem. Zeitschr.* 105: 307-336. 1920.—The 1st type of hexose fermentation yields alcohol and carbon dioxide; the 2nd acetaldehyde, carbon dioxide, and glycerol; the 3rd, acetic acid, alcohol, carbon dioxide, and glycerol. The 2nd type is considered primary, the carbon dioxide and acetaldehyde being derived from pyruvic acid. It is characterized by the amount of aldehyde fixed by sulphites as the bisulphite derivative. The 1st type is characterized by the amount of alcohol formed by reduction of acetaldehyde. In the 3rd type acetic acid and alcohol are formed from aldehyde by Cannizzaro's reaction, and the amount of acid or glycerol formed is characteristic. A quantitative cleavage of sugar to alcohol and carbon dioxide never occurs. When the 1st and 2nd types occur together the alcohol formed can be calculated as $46/90 (Z-180/92G)$ or $46/90 (180/44K-Z)$ where Z is transformed sugar; G , glycerol; and K , the total carbon dioxide produced. When the 1st and 3rd types occur together the amount of sugar fermented is: $(180A + 135G)/92$; or $180/92A + 135/30E$; or $90(K/44 + G/92)$ or $90(K/44 + E/130)$, where A is the total alcohol produced and E , acetic acid.—*H. D. Hooker, Jr.*

1468. OSTWALD, W. Zur physikalisch-chemischen Betrachtung der Gärungsvorgänge. [Physico-chemical consideration of fermentation.] *Biochem. Zeitschr.* 105: 305. 1920.—This is a reply to C. Neuberg [see Bot. Absts. 12, Entry 801].—*H. D. Hooker, Jr.*

METABOLISM (RESPIRATION, AERATION)

1469. FITCH, C. P. The cultivation of *Bact. abortus* Bang. *Proc. Soc. Exp. Biol. and Med.* 19: 414-415. 1922.—*Bact. abortus* was cultivated in the presence of 10 per cent hydrogen to show that diminished oxygen tension rather than any specific effect of CO_2 was responsible for the luxuriant growth of the organism.—*M. M. Brooks.*

1470. IRWIN, MARIAN, and MARGARET WEINSTEIN. Comparative studies on respiration XXI. Acid formation and decreased production of CO_2 due to ethyl alcohol. *Amer. Jour. Bot.* 9: 277-282. 2 fig. 1922.—By use of a previously described apparatus [see Bot. Absts. 10, Entry 291], the authors found that in radish seedlings ethyl alcohol decreases the production of CO_2 . At the same time, organic acids are produced, perhaps through the effect of the alcohol in accelerating the decomposition of certain substances and thus forming an excess of intermediate products in the form of acids. The fact that *Salvia* when treated with ether reacts in exactly the opposite manner, emphasizes the extreme complexity of the problems of respiration.—*E. W. Sinnott.*

1471. LANGWORTHY, C. F., and H. G. BAROTT. Heat elimination and gaseous exchange in grapefruit during storage. *Jour. Biol. Chem.* 50: Proc. XXXI. 1922.

1472. SMITH, EDITH PHILIP. Comparative studies on respiration XXII. The effect of lactic acid on the respiration of wheat. *Amer. Jour. Bot.* 9: 307-310. 2 fig. 1922.—In very

dilute solutions lactic acid first accelerates and then depresses the rate of production of CO_2 by wheat seedlings in water culture. As the concentration of the acid increases, this preliminary rise becomes less marked till a concentration is reached where the rate begins to fall at once. On removal to distilled water recovery is in time complete. Sulphuric acid and dextrose have practically no effect on rate of respiration and the observed results are therefore probably not due to osmotic pressure or H-ion concentration but to some specific action of lactic acid. It is concluded that since this acid does not cause a permanent increase in the rate of production of CO_2 , it is not an important intermediate substance in the metabolism of wheat.—*E. W. Sinnott.*

ORGANISM AS A WHOLE

1473. ABESAMIS, AMBROSIO P. Effect of time of planting on growth and yield of a lowland rice in Penaranda, Nueva Ecija, and on the college farm. *Philippine Agric.* 10: 381-392. 1922.—Time of transplanting and the amount of rainfall appeared to be very important factors in determining rice yield, high yields being correlated with large amounts of rainfall. Best cultures, which received about 1000 mm. of rainfall, gave a yield about 6 times as great as those which received less rainfall. Later maturity was also found to be correlated with greater amount of rainfall.—*Sam F. Trelease.*

1474. ARLOING, FERNAND, et LUCIEN THÉVENOT. Essais sur l'anaphylaxie chez les bactéries. Modifications produites par passages brusques dans les milieux de cultures bouillon-sérum à des taux différents. [Contributions to the study of anaphylaxis in bacteria. Modifications produced by abrupt changes in concentration of the bouillon-serum culture medium.] *Compt. Rend. Soc. Biol.* 87: 12-14. 1922.—Bacteria are very susceptible to sudden changes in composition of the medium and in consequence undergo modifications in their general biological characters. These changes are interpreted as being anaphylactic in nature, and involve the power of growth, virulence, and pigment formation of the bacteria.—*S. Morgulis.*

1475. CASELLA, DOMENICO. Studio sul polline delle piante da frutta. [The pollen of fruit trees.] *Staz. Sper. Agrarie Ital.* 54: 474-496. 1921.—The subjects studied are pollination; fruit formation; structure, form, color, and size of pollen grains of almond, peach, apricot, persimmon, pear, apple, grape, and mulberry; likewise the cultivation of the pollen in nutritive solutions, optimum sugar content of the germinating solution, types of germination, temperature relations, percentages of germination, and viability. The influence of germicidal substances on pollen germination and on fruiting are studied, as are also various teratological pollen forms. The conclusions are here summarized as follows: Pollination in the grape and mulberry is brought about by wind, whereas in the other plants studied (Rosaceae) it is brought about by insects. Rain, strong wind, and low temperature have a strongly deleterious influence on the process of pollination, whereas absence of rain and of fog, abundance of sunlight, moderate temperature, and a mild wind are advantageous. The form and size of pollen grains differ in the various species, varieties and even in individuals. The color varies in different genera. Saccharose in a concentration of 10-20 per cent is the best sugar for the germination of pollen. The pollen of grape is characterized by the formation of a small persistent bubble at the base of the pollen tube. Low temperatures interfere with germination and elongation of the pollen tube, whereas high temperatures accelerate the process. The optimum temperature is constant for each species and variety, as is also the percentage of germination. Pollen from diseased plants or branches has a lower percentage germination, while this power is slowly lost at a different rate in various varieties. With loss in germination capacity, not only a smaller percentage germinates, but the length of the germ tube is not as great as in normal pollen. Most germicidal substances (including sulphur) are deleterious to germination, even when applied directly to the plants during the flowering period. The same may be said for fruit inception. Abnormal types of germination are often observed.—*A. Bonazzi.*

1476. GERICKE, W. F. Certain relations between root development and tillering in wheat: Significance in the production of high-protein wheat. *Amer. Jour. Bot.* 9: 366-369. 1922.—More abundant tillering and culm production in wheat was obtained by the author in cultures

which received nitrogen comparatively late in the growing period than in those which received it at seeding, and he suggests that this may be due to differences in extent of root development at the time nitrogen was applied. He planted wheat seedlings, a few days old, in tap water where in 25 days they developed a large root system (presumably because of deficiency of nitrogen) but little new top growth. These seedlings were then placed in nutrient solutions, as was another set only a few days old, in which the tops were almost as large as in the first set but the roots only about $\frac{1}{4}$ as large. The set with the large root system developed more than 4 times as many tillers per plant as the one with the small system, presumably because of the larger absorbing area. Plants grown in nitrogen-poor soil similarly develop a large root system and when nitrogen is then added, absorb much more of this nutrient that is needed for normal growth, and abundant tillering results.—*E. W. Sinnott.*

1477. KNUDSON, LEWIS. Nonsymbiotic germination of orchid seeds. *Bot. Gaz.* 73: 1-25. 1922.—An account of earlier attempts to germinate orchid seed is given. The author employed agar slants on which were sown seed of *Cattleya* and *Laelia*. The nutritive medium was Pfeffer's solution and a modification thereof plus sugars. Fructose proved more favorable for growth of embryos than glucose. A plant extract (yeast, wheat) used with glucose, however, induced satisfactory germination. No gain in germination was obtained beyond 0.08 per cent concentration of the glucose. Introduction of *Bacillus radiculicola* proved definitely favorable. *Azotobacter* sp. retarded growth. Transplantation from tubes to Erlenmeyer flasks, thence to proper soil, was practiced. This method is believed to be commercially valuable. Regarding fungus relations the author suggests that "germination is induced not by any action of the fungus within the embryo but by products produced externally on digestion or secreted by the fungus." A final statement is made, however, that at this time the "validity of the fungus hypothesis cannot be proved or disproved."—*B. W. Wells.*

1478. SHULL, C. A. Soil conditions and plant growth. [Rev. of: RUSSELL, E. J. Soil conditions and plant growth. *Rev. ed.*, xii + 406 p., 32 fig. Longmans, Green & Co.: New York, 1921.] *Bot. Gaz.* 73: 153. 1922.

1479. WANSER, H. M. Photoperiodism of wheat; a determining factor in acclimatization. *Science* 56: 313-315. 1922.—From a study of the data for the behavior of winter and spring wheats as regards jointing and heading, it is concluded that there exists a critical stimulus for jointing and that it is a critical photoperiod with a maximum limit. Winter wheat also requires a separate and distinct photoperiod for heading but spring wheat can joint and head in the same season.—*C. J. Lyon.*

GROWTH, DEVELOPMENT, REPRODUCTION

1480. CLARK, N. A. The rate of formation and the yield of yeast in wort. *Jour. Phys. Chem.* 26: 42-60. 1922.—The rate of reproduction of "normal," actively budding yeast (*Saccharomyces cerevisiae*, race F) follows the "logarithmic formula," $\log C/C_0 = 0.160 t$, from the moment of seeding until the concentration is 100 million cells per cc. (regardless of whether seeding was 5 cells or 8 million cells or more per cc.) if the culture is properly shaken and aerated. In this equation C_0 signifies the initial number of yeast cells per cc. and C the number at any time, t . The solution with 100 million cells per cc. contains 1.8 gm. of alcohol per 100 cc. Above this alcohol content the number 0.160 in the equation must be replaced by a quantity that is a function of the percentage of alcohol if the percentage be below 5. The maximum number of cells is about 325 million per cc. although if the wort were heavily inoculated (up to 400 per cc.) the crop might reach 675 million because of the lower alcohol content. If the culture is diluted but contains 10 per cent or more of wort, the rate and the maximum are the same as if pure wort had been used. If less wort is used the rate is the same but the maximum is low because there is too little bios (perhaps the "water-soluble vitamine"). Quantitative measurements of the crop may be used to determine quantitatively the amount of bios; the maximum is reached in about 24 hours. Washed yeast cake rapidly absorbs bios from wort and if enough yeast is used the removal is practically complete and the cells do not bud.—*H. E. Pulling.*

1481. KÖHLER, E. Über rhythmische Erscheinungen bei Wachstum und Gärung der Hefe. [Periodicity in yeast growth and fermentation.] *Biochem. Zeitschr.* 106: 194-206. 1920.—Yeast fermentation and growth during alcoholic fermentation showed periodicity caused by changes in the sugar and alcohol content of the nutrient medium. The rate of growth is determined by the sugar concentration but the growth curve was irregular at high concentrations.—*H. D. Hooker, Jr.*

1482. REED, H. S. A method for obtaining constants for formulas of organic growth. *Proc. Nation. Acad. Sci. [U. S. A.]* 7: 311-316. 3 fig. 1921.—The equation of autocatalysis, $\log \frac{x}{A-x} = K(t-t_1)$ sometimes gives values for x which are somewhat too large in the early life of an organism. The author describes a simple graphic method which may be used to overcome the difficulty. Assuming that the true state of affairs is represented by the equation: $\log \frac{x}{A-x} = K(t-t_1)^c$, we may write: $\log (\log \frac{x}{A-x}) = \log K + c \log (t-t_1)$. This is the equation of a straight line if $\log (\log \frac{x}{A-x})$ be used as ordinate and $\log (t-t_1)$ as abscissa. The intercept of this line on the y -axis will be $\log K$ and the slope of the line, c . Examples of the use of the method are given showing the computed values of x obtained for the growth of shoots on several trees.—*H. S. Reed.*

1483. SCHAFFNER, J. H. Progression of sexual evolution in the plant kingdom. *Ohio Jour. Sci.* 22: 101-113. 1922.—The main factor in the evolution of sexual dimorphism is said to be the shifting of the time when sexual states arise from the neutral state, ranging from a late stage of gametogenesis in the lowest forms backward through ontogenetic history until the sexual state of both sporophyte and gametophyte is established when the egg is fertilized or even before. On this basis plants are classified in 4 main groups: (1) those having no sexual stage; (2) a series with reduction of chromosomes in the zygote or at the end of the sexual generation just before gametogenesis; (3) a homosporous series with antithetic alternation of generations; and (4) a similar heterosporous series with the gametophytes unisexual and the sporophytes bisporangiate or monosporangiate. Since the sexual state is usually determined in somatic cells when neither segregation nor association of chromosomes is taking place, it is concluded that sex cannot be associated primarily with special chromosomes and that fundamental sexual phenomena are caused by properties entirely apart from Mendelian units.—*H. D. Hooker, Jr.*

1484. SPEK, J. Beiträge zur Kolloidchemie der Zellteilung. [The colloid chemistry of cell division.] *Kolloidchem. Beih.* 12: 1-91. 1920.—Many observations during the author's 3-year study support O. Bütschli's hypothesis that changes in surface tension induce cell division, but questions concerning the physical chemistry of the process were untouched by Bütschli. Of these the chief are: Is a definite water content necessary for cell divisions? Does increase in water content lead to division? Recent researches of others establish an increased permeability of the cells just before division and this the author thinks must be due to either increased swelling of membrane and plasma colloids or to a decrease in the precipitating power of the outer medium. Since the latter does not take place the former must occur, either by increased hydration or plasma alteration in the direction: gel to sol; or both. If by any means the permeability is increased, water will be absorbed unless the plasma is saturated, so that increase in water content might not induce cell division but only accompany it. If increase in water content is causative, treating the cell with reagents that increase imbibition (previous researches indicated that the ions affect it in the following order: $\text{SCN} > \text{I} > \text{BR} > \text{NO}_3 > \text{ClO}_3 > \text{Cl} > \text{acetate} > \text{SO}_4$; $\text{Li} > \text{K} > \text{Na} > \text{alkaline earths}$; fatty acids and narcotics also increase imbibition) should induce cell division. This is known to be true, especially from work on artificial parthenogenesis. The author also tested this, using *Paramoecium* in salt-solution-hay-infusion cultures. In all experiments decidedly more abundant cell division occurred in the medium than in the controls, frequently 10 times as much. Salts that do not penetrate the

protoplasm withdraw water by osmosis and decrease the rate of growth and the rate of division, whereas the effective salts increase the volume of the cell. Concerning the action of the salts the author suggests that before division the cell becomes more liquid at the expense of those protoplasmic structures that maintain the form of the cell. This increase in fluidity permits hydrodynamic effects and the cell becomes more nearly spherical and stains less vividly. This is also characteristic of those pathological (embryonal) conditions that are characterized by rapid cell division. There are now 2 possibilities: (1) gas exchange is easier when the plasma is more fluid and respiration is more rapid. This should be experimentally investigated. (2) There is an acceleration of those processes in which water directly plays a part. At the beginning of cell division there is formation of nucleoproteins and this is supposed to be at the expense of bodies that contain lecithin and phosphoric acid. But since lecithin is thereby hydrolyzed, the importance of water in the first steps of the chemical degradation of cell materials is indicated. At the outset the process proceeds with the normal amount of water and oxygen, but during nuclein formation probably a base (cholin) is liberated which increases imbibition by the colloids, increases the amount of water that is held, facilitates gas exchange, and so increases the formation of nucleoproteins. The author discusses the mechanism of parthenogenesis and reviews the literature of cell division, the experimental evidence of which, he believes, supports his conceptions.—*H. E. Pulling.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1485. BREMEKAMP, C. E. B. Über den Einfluss des Lichtes auf die geotropische Reaktion. [The influence of light on the geotropic reaction.] *Recueil Trav. Bot. Néerland.* 18: 373-438. 3 pl., 9 fig. 1921.—In these experiments there were used coleoptiles of a pure-line *Avena*. As an average geotropic reaction was desired the plants were kept in a horizontal position for 5, 15, 20, 30, or 45 minutes (usually 20 minutes), but when the centrifugal apparatus was used the time of induction was considerably shortened. The strongest light source was a Philips $\frac{1}{2}$ Watt lamp op + 300 H. K., the heat rays of which were absorbed by a cooling apparatus. The light was examined at intervals by a Weber photometer.—When illuminated seedlings are in a horizontal position, the normal geotropic curvature is followed by an antitrope curvature. If, before illumination, seedlings are placed directly in a horizontal position, the antitropous curvature is at first noticed at the apex, extending later toward the base. Plants remaining erect for a time after illumination do not show antitropous curvature at the top; but in regions progressively further from the apex, more time elapses between illumination and orientation in a horizontal position.—The amount of photogenic antigeotropic curvature depends upon time and intensity of illumination.—A one-sided illumination when strong enough is as important as a several-sided illumination in causing an antigeotropic curvature in plants which remain for some time in the horizontal position, though too much time should not elapse between the illumination interval and the horizontal arrangement.—*J. C. Th. Uphof.*

1486. MERL, EDMUND M. Biologische Studien über die Utriculariablase. [Biological studies of the Utricularia bladder.] *Flora* 115: 59-74. 3 fig. 1922.—Repetitions and original experiments led to the following conclusions: the engulfing of small animals is not due to their activity but to the action of the bladder; contracted bladders are in an irritable condition and a touch upon the bristles or the lip near the bristles causes the lip to contract, forming an opening, and the walls of the bladder to expand so that the suction created draws in whatever may be in the vicinity of the opening; after a resting period the bladder is again irritable; when bladders are removed from water partial drying causes a difference in tension which brings about the reaction; puncture causes permanent expansion. The reaction is bound up with the turgescence of the plant but is difficult to explain. No effect is produced by ammonia, glycerine, alcohol, mercuric chloride, ether, chloroform, an electric current, or lowered atmospheric pressure. Irritability could not be eliminated by cold, heat, or narcotics until there was serious injury to the bladder. A stimulus does not appear to change the size of the intercellular air spaces, as in *Mimosa*, although this is difficult to determine under the high power necessary for observation. The position, shape, and action of the bristles suggest the stimula-

tion theory. Another explanation suggested is that the elastic lip and side walls are in equilibrium; the slightest motion disturbs this and the lip and walls spring back; the inner hairs absorb water and restore equilibrium. The 2 difficulties confronting this theory are: (1) the bladders act the same whether filled with air or water; (2) the extreme slowness of water movement in plant plants. Methylene blue quickly stains the inner hairs, but there is no movement in the vessels.—*L. M. Snow.*

1487. SIERP, HERMANN. Über den Einfluss geringer Lichtmengen auf die Zuwachsbe-
wegungen der Koleoptile von *Avena sativa*. [The influence of small quantities of light on the
growth movement of the coleoptile of *Avena sativa*.] Ber. Deutsch. Bot. Ges. 37: 123-128.
1919.—The author's measurements of the change in growth rate of oat coleoptiles after expo-
sure to relatively weak light stimulation were prompted by Vogt's statement (Zeitschr.
Bot. 7: 1915) that illumination of 2880 meter-candle-seconds (M.C.S.) (16 meter-candles [M.C.]
for 3 minutes) or less produced no distinct change in the growth rate of the coleoptiles, and by
Blaauw's reference of [Zeitschr. Bot. 6: and 7:] the phototropic curvatures (which he secured
with illumination intensities as low as 10-20 M.C.S.) to the influence of light upon the growth
rate of the illuminated side of the coleoptile. Sierp found changes in the growth rate follow-
ing such weak stimulation as 10 M.C.S. (10 M.C. for 1 second). His tables and curves show
the changes in growth rate for a period of 4 hours after exposure to illumination of 10, 100,
and 2000 M. C. S.—*R. M. Holman.*

1488. WEEVERS, TH. Concerning the influence of light and gravitation on *Pellia epiphylla*
(Corda). Proc. Roy. Acad. Sci. Amsterdam [translated from Verslag K. Akad. Wetenschappen
Amsterdam] 24: 2-11. 1921.—Experiments are presented on the phototropic, photogrowth,
and geotropic reactions of the growing sporogonium stalks of *Pellia*. The entire stalk is per-
ceptive of the stimulus and any stimulated part may respond. In phototropic experiments,
stalks 15-25 mm. in length were used. Exposed unilaterally to sunlight, distinct curvature
appears in 5 minutes. The minimum stimulus effecting a response was light energy equiva-
lent to 400 meter-candle-seconds (M. C. S.); reaction time was 150 minutes. The shortest reac-
tion time was effected by 15,000,000 M. C. S. This is contrasted with the shortest reaction time
for *Avena*, which is about 100 M. C. S. No pronounced negative reaction was observed.—
The blue rays are shown to be the effective rays.—Using light of 75 M. C. with an energy value
of 22,500-45,000 M. C. S., a distinct photogrowth reaction was produced on the sporogonium
stalks of plants that had been kept in the dark. The mean retardation in growth of 6 observa-
tions was 35 per cent.—Stems are negatively geotropic. The minimum exposure period result-
ing in a reaction was 10 minutes and the reaction time was 150 minutes. The author suggests
that turgor changes have nothing to do with curvature of the stalk and that an explanation
must take into consideration the colloidal chemistry of protoplasm and cell wall.—*L. Knudson.*

GERMINATION, RENEWAL OF ACTIVITY

1489. BAINES, A. E. Germination in its electrical aspect. 185 p., 130 fig. George
Rutledge & Sons: London; E. P. Dutton & Co.: New York, 1921.—The author contends that
plants possess electrical systems and that such organs as fruits, seeds, and stems are electrical
cells incapable of being polarized. For example, the edible portion of the apple, charged
positively by the air which enters at the open calyx end, continuously induces a negative
charge in the core, from which it is separated by a non-conductive tissue. Such processes
as cell division, growth, seed germination, and life itself, inexplicable on the basis of chemical
reactions alone, are dependent on stimuli which are electrical in nature. "The fundamental
principle governing the nature of a seed is this: the seed substance must receive a continuous
charge of electricity; this charge must be induced or the seed would rot, and no such charge
can be imparted until the seed becomes in effect a Leyden jar." Plants grown in electrified
soil exceed controls and in electrified soil less moisture is required to produce a given amount
of growth. An attempt is made to explain hearing, sleep, and allied phenomena, even cancer,
on the basis of electrical stimuli, though few practical data are presented. [See also Bot. Absts.
10, Entry 1976; 11, Entry 816].—*S. G. Lehman.*

1490. FRYER, J. R. Influence of light and fluctuating temperature on the germination of *Poa compressa*. Sci. Agric. 2: 225-230. 1922.—Sunlight was believed to be somewhat beneficial in germinating *Poa compressa*. Daily fluctuations in temperature between 16 and 35°C. were most suitable and better than a steady temperature.—B. T. Dickson.

1491. McHARGUE, J. S. Some points of interest concerning the cocklebur and its seeds. Ecology 2: 110-119. 1 fig. 1921.—The writer lists the native species of *Xanthium* as *X. canadense*, *X. commune*, *X. speciosum*, and *X. echinatum*; while those native of the old world are, *X. spinosum* and *X. strumarium*. Possibilities of the use of the seed for oil and a consideration of the plant as a pest to the agriculturist and wool-growers are given. The morphology of the paired seed in the bur is described and the delayed germination of the smaller one discussed. The older work of Arthur, Masterman, and Crocker which furnished the theory that the delay in germination of the smaller seed until the 2nd spring is due to differences in the enzyme content of the embryo or to differences in the character of the seed-coats is reviewed. With selected-seed of *X. commune* the writer found equal amounts of oxidases and peroxidases, indicating equal viabilities in large and small seed. Germination tests of seed removed from the burs showed that 100 per cent of the larger seed and 86 per cent of the smaller germinated in a given time with a tardiness of 24 hours as a mean for the smaller. There is no marked dormancy of such seed and no inherent property for delayed germination in embryos or seed-coats. Another series of tests showed that the conditions in the bur were the cause of the delay in *X. commune*. The septum of the bur which protects the smaller seed is thicker and shorter than that of the larger seed and this prevents the absorption of oxygen or moisture as readily as in the larger. By the 2nd spring this septum has disintegrated enough to allow germination of the smaller seed. Occasionally simultaneous germinations do occur. Differences in vigor of the 2 seedlings are due to the larger amount of food in the large seed; other tests showed the presence of a glucoside in larger amounts in the large seed. Sugars are formed from fats or cellulose as these seed contain no starch. The presence of oxidases, peroxidases, catalase, proteolytic and lipoclastic enzymes was demonstrated. Histological examinations showed that the cells of large and small seed are identical.—H. H. M. Bowman.

1492. WEBB, ROBERT W. Studies in the physiology of the fungi. XV. Germination of the spores of certain fungi in relation to hydrogen-ion concentration. Ann. Missouri Bot. Gard. 8: 283-341. Fig. 1-39. 1921.—In continuation of work previously reported [see Bot. Absts. 4, Entry 1575] Webb has broadened his experiments on the effects of active H- and OH-ions upon germination by the use of solutions other than mannite, such as Czapek's solution, peptone, beet decoction, water, and mannite + beet decoction. The spores of the following fungi were utilized: acid forms, *Botrytis cinerea*, *Aspergillus niger*, *Penicillium cyclopium*, *P. italicum*, *Puccinia graminis*, and *Lenzites saepiaria*; acid and alkaline form, *Fusarium* sp.; alkaline form, *Colletotrichum Gossypii*. Experiments show that under favorable nutritive conditions the active H-ions are favorable to germination while the OH-ions are relatively detrimental. The optimum active acidity for a majority of the fungi seems to range between pH 4.0 and 3.0. The limits on the acid side are comparatively narrow, inhibition being reached near pH 2.5-1.5. The limits on the alkaline side are very diverse, varying with the organism and medium. The various nutritive solutions used gave different ranges, and percentages, of germination. From visual observations the mycelial growth is inhibited by virtually the same H- and OH- ion concentrations as those which have inhibitive action on germination. In equal concentrations of the 2, the OH- ions are relatively more toxic to spores than the H-ions. The composition of the medium seems to influence the activity of the OH-ions in this respect more than the H-ions may be antagonized. The range of shifting of reaction depends on the organism and composition and original reaction of the medium. Under conditions of active alkalinity the range of germination in beet decoction is noticeably expanded. Germination here may be stimulated by some special substance or condition (possibly buffer effect?), which may be wanting in synthetic media.—Increasing the incubation period does not change the relation of germination to H-ion concentration. "The curves of germination for any organism are practically identical, whether incubated at a temperature representing a pro-

visional optimum, or at 4-5°C. above or below such an optimum. Germination often occurs feebly in cultures possessing a H-ion concentration closely approaching that of inhibition" and differences manifest within favorable ranges tend "to occur over the widest range at the optimum temperature." The data developed in this paper are of fundamental importance in the future study of acid or alkaline fungicides or spray mixtures which may be applied to control the germination of fungous spores.—S. M. Zeller.

1493. YOUNGMAN, W. The influence of atmospheric conditions upon the germination of Indian barley. Mem. Dept. Agric. India Bot. Ser. 11: 145-151. 1921.—Experiments on the influence of humidity on the germination of Indian barley are described. A vapor pressure of 0.87 inches (0.0213 gm. water vapor per l. of air) may be taken as the safest maximum to which Indian barley, intended for export for malting purposes, may be exposed. Exposure for 14 weeks to this degree of humidity has no deleterious effect. Exposure to greater amounts of humidity than this is serious. A vapor pressure of 0.89 inches (0.0216 gm. water vapor per l.) after 14 weeks or less reduces the germination by some 25 per cent, and higher humidity totally destroys germinating power in 14 weeks or less.—A. Howard.

TEMPERATURE RELATIONS

1494. EVANS, CLYTEE R. Effect of temperature on germination of *Amaranthus retroflexus*. Bot. Gaz. 73: 213-225. Fig. 1-4. 1922.—A summary of the literature dealing with the temperature factor is given. The author finds that the behavior of *Amaranthus* seed parallels the data of Leitch (pea seedlings), Lebenbaur (corn seedlings), and Ball (sore shin fungus) with regard to coefficients relating rate of germination to temperature. For methods of seed treatment (abrasion, acid) the general trend of the coefficients was the same. The restricting effect of the coats is shown particularly in the case of after-ripened seed at low (8-11.6°C.) and at high (42-46.1°C.) temperatures. These effects can be lessened by treating the coats with sulphuric acid or abrading them with sand.—B. W. Wells.

1495. SIGALAS, R., et H. MARNEFFE. A propos de la résistance de quelques graines à de hautes températures. [The resistance of certain grains to high temperatures.] Compt. Rend. Soc. Biol. 87: 193-195. 1922.—Experiments confirm Gain's discovery that the seed of *Helianthus annuus* L. may be exposed to heat up to about 150°C. without losing the power to germinate.—S. Morgulis.

1496. STEVENS, NEIL E. Environmental temperatures of fungi in nature. Amer. Jour. Bot. 9: 385-390. 1 fig. 1922.—Plant parts when exposed to the sun often show a temperature which is markedly above that of the air and which may fluctuate more rapidly and extremely than does the air temperature in the shade. The temperature environment of the fungi which grow on these plant parts must therefore differ widely from that which is usually supplied them when growing in pure culture in heated laboratories.—E. W. Sinnott.

RADIANT ENERGY RELATIONS

1497. HARVEY, R. B. Growth of plants in artificial light from seed to seed. Science 56: 366-367. 1922.—By the use of continuous artificial light, crops of wheat, oats, barley, rye, potatoes, buckwheat, lettuce, beans, peas, radishes, etc., were grown and produced viable seed in seasons much shorter than by daylight. No such fixed period of illumination, as found essential by Garner and Allard, seemed necessary except for cabbage. Plant breeders can use this method to produce more generations.—C. J. Lyon.

TOXIC AGENTS

1498. CLOWES, G. H. A., and H. W. SMITH. Carbon dioxide as an inhibitor of cell growth. Jour. Biol. Chem. 50: Proc. IV. 1922.—Carbon dioxide has an inhibitory effect in cell growth, bearing no relation to H-ion concentration.—G. B. Rigg.

1499. COOK, F. C. Changes in the composition of the Irish potato tuber during growth with particular reference to the influence of copper sprays. *Jour. Biol. Chem.* 50: Proc. XIII. 1922. —Copper sprays have a beneficial effect on the growth and development of potato tubers. This was true in northern Maine in 1921 when no *Phytophthora infestans* was present.—G. B. Rigg.

1500. DOERR, R. Zur Oligodynamie des Silbers. [Oligodynamics of silver.] *Biochem. Zeitschr.* 106: 110–133. 1920.—Water long in contact with metallic silver becomes bactericidal (oligodynamic). The disinfectant property was quantitatively decreased by dilution with distilled water and quantitatively increased upon concentration by distillation. Sodium chloride was antagonistic, weakening and delaying the bactericidal effect. Horse serum destroyed it. Some bacteria were more susceptible than others to metallic silver. Solutions of silver salts had all the properties of the bactericidal water, which was thought to owe its oligodynamic property to silver oxide in solution.—H. D. Hooker, Jr.

1501. FULMER, ELLIS I. The acclimatization of yeast to ammonium fluoride and its reversion in wort. *Jour. Phys. Chem.* 25: 455–472. 1921.

1502. GUÉRIN, P. L'action du chlore et de certaines vapeurs sur les plantes supérieures. [The action of chlorine and certain vapors upon the higher plants.] *Ann. Sci. Agron. Française et Étrangère* 38: 10–19. 1921.—The literature is briefly reviewed and the results of a series of experiments on many genera and species of higher plants with chlorine, methyl mono-chlor chloroformate, bromacetone, ethyl di-chlor sulphide (mustard gas), chloroform, ether, ethyl chloride, several alcohols, phenols, and aldehydes are reported. Chlorine gas was most severe in its action, causing the plants to lose their leaves. In other cases the effects varied from a slight bleaching to a blackening of the leaves. The effect of the treatments is a plasmolysis, which was proved by microscopic examination of affected tissue and by the reddening of sodium picrate papers suspended in vessels above treated plants. It is claimed that in the plasmolytic action hydrocyanic acid liberated by the action of emulsin on a glucoside acts on the paper. Certain odors emanated by some plants during treatment are noted as further evidence of plasmolysis.—A. B. Beaumont.

1503. MÜLLER, ALFR. Die Resistenz der Milzbrandsporen gegen Chlor, Pickelflüssigkeit, Formaldehyd und Sublimat. [The resistance of anthrax spores to chlorine, pus, formaldehyde, and sublimate.] *Dissertation.* 12 p. München, 1920.

1504. NEMEC, A., und F. STRANAK. Beitrag zur Kenntnis des toxischen Einflusses der Terpene auf die höheren Pflanzen. [The toxicity of terpenes to the higher plants.] *Biochem. Zeitschr.* 104: 200–213. Pl. 1–7. 1920.—Characteristic alterations in histological structure arose from subjecting plants to terpene vapors. The xylem tracheae and epidermis became brown in sprouted beans, corn, yellow lupines, and peas, and black in etiolated specimens of these plants. The discoloration is attributed to oxidation of tannins to so-called humins by peroxidases, the terpenes playing the role of peroxides.—H. D. Hooker, Jr.

1505. WINDISCH, W., W. HENNEBERG, und W. DIETRICH. Über die Einwirkung oberflächenaktiver Nonylsäure und einiger oberflächenaktiver höherer Homologe der Alkoholreihe (Amylalkohol und Octylalkohol) auf die Hefezelle und die Gärung. [The influence of nonylic acid, amyl alcohol, and octyl alcohol on yeast and fermentation.] *Biochem. Zeitschr.* 107: 172–190. 1920.—Nonylic acid in concentrations ranging from 0.005 to 0.02 per cent and octyl alcohol in concentrations from 0.017 to 0.04 per cent retarded and finally stopped fermentation, inducing pathologic conditions and eventually death of the yeast cells. Alteration of cell shape and fat formation occurred at the same time. These phenomena are attributed to "surface activity" and not to chemical properties. This influence is thought to have practical significance as the same or similar "surface active" compounds arise during fermentation.—H. D. Hooker, Jr.

ELECTRICITY AND MECHANICAL FORCES

1506. STERN, KURT. Über polare elektronastische Erscheinungen, 3 Mitteilung. [On polar electronastic phenomena. Third communication.] Ber. Deutsch. Bot. Ges. 40: 43-51. Fig. 1-2. 1922.—The question which the author seeks to answer is: How do the polar reactions of *Mimosa pulvini* behave with different stimulus intensities, (a) of direct current, (b) of condenser discharge, and (c) of induction shock? Attention is called to 3 important sources of error which are related (1) to the effect of different current intensities, (2) to the formation of parallel currents or branching currents, and (3) to the stimulus-conducting processes. Although the applied potential in volts is often used (by Bose, the present author, and many others) as an approximate measure of an electrical stimulation, the electrical potential as such does not act as a stimulus. This is shown by the fact that when a *Mimosa* plant standing upon a paraffin plate is brought into contact with the pole of an electrical conductor charged to 240 volts, no visible reaction ensues, although the plant is thus charged to this high potential. However, when the pot is grounded an intense reaction follows, the result not of the mere charge but of the passage of a current from the 240-volt pole to the earth. It is the strength of this current and not the potential applied which, other things being equal, determines the stimulus. Since the resistance offered by the plant to the passage of the current influences the strength of the current, the voltage applied can be used as a measure of the stimulus intensity only when the current passes through the same portions of the plant or through portions of the same or different plants offering equal resistance. Experimentally, the resistance is not proportional to the length of the region of the plant through which the current passes, due probably to differences in diameter of the water-conducting elements in different parts of the plant (e.g., stem and petiole). Leaflets of the same leaf differ greatly in resistance, and old leaves offer much greater resistance than corresponding portions of younger leaves, presumably on account of the presence of more air in the vessels of the older leaves. Strength of current and also the dimensions of the cross section of the organ stimulated must be taken into account in determining the intensity of the stimulus. Errors may arise as the result of the sudden movement of the whole shoot (a movement which often interrupts the current by destroying the contact of one of the electrodes) when the circuit is closed.—*R. M. Holman.*

MISCELLANEOUS

1507. HARRISON, ARTHUR P. A simple gas generator for laboratory use. Science 56: 287-288. 1922.—This paper explains the construction and operation of a generator suitable for gases used in the laboratory in comparatively small quantities. It can be made of materials found in all laboratory equipment and but 1 generator is needed for the several gases.—A wide mouth bottle contains the acid, the stopper of which has a small stopcock opening and a larger hole for the insertion of a large test tube. Into this tube is set (through a rubber stopper) a smaller test tube containing the solid reagents. Contact between reagents is effected by small holes in the bottoms of the tubes, and the gas pressure controls the entrance of the acid.—*C. J. Lyon.*

1508. PFYL, B., G. REIF, und A. HANNER. Über den Ersatz des Morphins beim Nachweis von Methylalkohol in Trinkbranntweinen. [Substitutes for morphine in testing potable spirits for methyl alcohol.] Zeitschr. untersuch. Nahrungs- u. Genussmittel 42: 218-225. 1921.

1509. VISCIO, SABATO. Sul valore alimentare dei semi dell'Ervum Ervilia. Nota IV. [The food value of seed of *Ervum Ervilia*.] Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) 31: 391-394. 1922.—Rats fed with flour made from the seed of *Ervum Ervilia* to which a small proportion of purified casein from milk had been added showed none of the loss in weight or symptoms of disease resulting when fed on the seed of *E. Ervilia* alone.—*F. M. Blodgett.*

SOIL SCIENCE

A. G. McCALL, *Editor*

(See in this issue Entries 939, 952, 954, 957, 959, 966, 967, 972, 973, 1075, 1077, 1078, 1397, 1424, 1427, 1478)

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*E. B. PAYSON, *Assistant Editor*

(See in this issue Entries 1004, 1006, 1093, 1094, 1113, 1372, 1388, 1513)

MISCELLANEOUS

B. E. LIVINGSTON, *Editor*S. F. TRELEASE, *Assistant Editor*

1510. ANONYMOUS. Making petroleum from colza oil. *Sci. Amer.* 126: 93. 1922.

1511. ANONYMOUS. Neunzehnte Hauptversammlung des Vereins deutscher Nahrungsmittelchemiker zu Jena am 19. bis 22. September, 1921. [Nineteenth Convention of German Society of Food Chemists at Jena, September 19-22, 1921.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 43: 1-168. 1922.—Minutes and presentation of papers, some of which are elsewhere noted are given.—*E. E. Stanford.*

1512. ANONYMOUS. The consumption of wheat in New South Wales. *Agric. Gaz. New South Wales* 33: 624. 1922.—The per capita consumption of wheat in New South Wales has decreased from 5.7 to 5 bushels during the past 3 years. [Reviewed from Official Year Book of New South Wales.]—*L. R. Waldron.*

1513. BEHRE, A. Die Methoden der Kunsthoniguntersuchung, insbesondere der Bestimmung der Saccharose und des Stärkesirups. [Methods of investigation of artificial honey, with special reference to the estimation of saccharose and glucose.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 43: 24-44. 1922.

1514. BEYTHIEN, A. Über Kunsthonig. Bericht über die erneute Beratung der vom Verein Deutscher Nahrungsmittelchemiker ernannten Kommission mit Vertretern der Industrie [Artificial honey. Report in the revised agreement between the committee appointed by the Society of German Food Chemists with representatives of the industry.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 43: 153-157. 1922.

1515. BLAKE, S. F. Native names and uses of some plants of eastern Guatemala and Honduras. *Contrib. U. S. Nation. Herb.* 24⁴: 87-100. *Pl.* 29-33. 1922.—This paper consists of an alphabetical list of the vernacular names of certain plants of eastern Guatemala and Honduras collected by the botanists of a State Department Mission of 1919. The vernacular names are cross-referred to the corresponding scientific names, arranged in the same alphabet, under which brief notes on the uses of the plants are given. Five of the species are illustrated — *Achras chicle*, *Cassia alata*, *Neurolaena lobata*, *Piper auritum amplifolium*, and *Smilax ornata*.—*S. F. Blake.*

1516. BRITTON, ELIZABETH G. Plant sanctuaries. *Amer. Fern Jour.* 11: 108-109. 1921 [1922].

1517. DENHAM, H. J. A multiple switch and commutator for thermocouples. *New Phytol.* 21: 166-168. 1 fig. 1922.—A rotary commutator designed to work in an oil bath at constant temperature is described.—*I. F. Lewis.*

1518. DENHAM, H. J. Laboratory notes. The projection microscope. *New Phytol.* 21: 163-165. 1 fig. 1922.—Suggested improvements and comments on the projection apparatus of Small [see *Bot. Absts.* 12, Entry 1529] are given.—*I. F. Lewis.*

1519. GINSBERG, I. Artificial cork. Waste materials used in its manufacture, and the applications found for it. *Sci. Amer.* 126: 91. 5 fig. 1922.

1520. GRIFFITH, IVOR. Hay fever diagnosis and treatment. *Amer. Jour. Pharm.* 94: 586-589. 1922.—The author quotes work by Scheppegegrell on the classification of hay-fever-producing plants, and adds a few notes as to diagnostic tests and prophylactic treatment by means of pollen extracts.—*Anton Hogstad, Jr.*

1521. HAAS, PAUL. The importance of carbohydrates in present-day economy. *Pharm. Jour.* 108: 222-224. 1922.—A summary of the indispensable and universal uses of carbohydrates as food and in the industries is combined with a summary of the more important efforts within recent years to increase the world production of carbohydrates. The Stone Age, the Bronze Age, and the Iron Age mark successive epochs of human civilization; the present epoch might not inaptly be described as the Carbohydrate Age.—*E. N. Gathercoal.*

1522. JUCKENACK, A. Über Ernährungsfragen vom Standpunkte der Wissenschaft, Wirtschaft und Gesetzgebung. [Nutritional questions from the standpoints of science, domestic economy and legislation.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 43: 9-21. 1922.

1523. LA WALL, CHARLES H. Foods of the next century. *Amer. Jour. Pharm.* 94: 309-329. 1922.—This popular lecture concerns the various types of food cranks,—the calory crank—the vitam in crank, and the imaginative individual who looks forward to the synthetic foods of the future, when by swallowing tablets the time devoted to dining will be saved. The foods of the past and the food problem of the future are discussed. A list of some 20 food yielding plants of foreign lands is given.—*Anton Hogstad, Jr.*

1524. LEVY, FRITZ. [Rev. of: SCHAFER, JOSEF. Vorlesungen über Histologie und Histogenese nebst Bemerkungen über Histotechnik und das Mikroskop. (Readings on histology and histogenesis, with remarks concerning histological technique and the microscope.) viii + 528 p., 12 pl., 589 fig. Wilhelm Engelmann: Leipzig, 1920.] *Arch. Zellf.* 16: 286-287. 1922.

1525. MASKEN, FREDERICK. Disinfecting railroad cars. *Monthly Bull. California Dept. Agric.* 10: 260-265. 1921.—After several experiments in cleaning and disinfecting cars, live steam came into use at a cost of only 85 cents per car. By use of this method, a minimum temperature of 180°F. can be attained in 10 minutes. An ordinary locomotive engine is used. To test the efficiency of this method, a case containing various live insects was placed in the car, and in a very short time after the steam was turned on all were killed.—*E. L. Overholser.*

1526. MOSLER. [Rev. of: PFEIFFER, CHR. Grundbegriffe der photographischen Optik. (Fundamental principles of photographic optics.) Th. Thomas: Leipzig, ?] *Arch. Zellf.* 16: 285-286. 1922.

1527. PAUL, THEODOR. Der Süßzingsgrad der Süßstoffe. [Sweetening power of sweetening materials.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 43: 137-149. 1922.

1528. S., T. **The Hull meeting of the British Association.** *Nature* 109: 784-786. 1922.—Advance notice, chiefly descriptive of the locality, is given.—*O. A. Stevens.*

1529. SMALL, JAMES. **Notes on an easy method of camera lucida drawing.** *New Phytol.* 20: 238-241. *Fig. 1-2.* 1921.—The image is thrown directly on paper, placed flat upon the bench, by means of a small right-angled prism.—*I. F. Lewis.*

1530. TAYLER, W. E. **A national scheme for conservation of fodder.** *Agric. Gaz. New South Wales* 33: 314-316. 1922.—It is advocated that the state purchase surplus fodder, such as alfalfa, in years of abundance, to be held for years of scarcity, and then to be resold to those needing it.—*L. R. Waldron.*

1531. WINTERS, S. R. **Making tea from holly.** *Sci. Amer.* 126: 181. 2 *fig.* 1922.

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12

MARCH-APRIL, 1923

No. 3

ENTRIES 1532-2224

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 1645, 1652, 1759, 1777, 1782, 1801, 1811, 1836, 1873, 1887, 2039, 2080, 2132, 2133, 2160, 2162)

1532. ANONYMOUS. A classification and detailed description of some of the wheats of Australia. Commonwealth of Australia Inst. Sci. and Indust. Bull. 18. 48 p., 5 pl. (1 colored). 1920.—Classification is based upon 8 botanical and 4 agricultural characters, each of which is described in some detail. There are described 43 varieties of *Triticum sativum*, included in 22 "types," and 3 varieties of 3 types of *T. durum*. The history of each variety is indicated.—*L. R. Waldron*.

1533. ANONYMOUS. Det kgl. danske Landhusholdningsselskabs Generalforsamling. [The Royal Danish Agricultural Society's annual general meeting.] Tidsskr. Landokonomi 1922: 125-142. 1922.—This article gives the society's recommendations for a better system of regulating the importation of grain and cattle feed into Denmark.—*Albert A. Hansen*.

1534. ANONYMOUS. Die Feststellung des Düngerbedürfnisses der Böden durch einfache Düngungsversuche. [Determining the fertilizer requirement of soils by simple fertilizer experiments.] Mitteil. Deutsch. Landw. Ges. 37: Flugblatt 62. 1922.—Popular.—*A. J. Pieters*.

1535. ANONYMOUS. Tobacco growing in Ireland. The experiments in 1921. Jour. Dept. Agric. Ireland 22: 26-30. 1922.—Various difficulties in growing and marketing are detailed.—*Donald Folsom*.

1536. BAKER, O. E., C. F. BROOKS, J. R. COVERT, and R. G. HAINSWORTH. Seedtime and harvest. A graphic study of seasonal work on farm crops. U. S. Dept. Agric. Dept. Circ. 183. 53 p. 1922.—This is a presentation of maps showing dates when planting, harvesting, and other operations are performed in the culture of staple crops in different parts of the U. S. A.—*L. R. Hesler*.

1537. BARTLETT, H. Western wheat growing competition. An analysis of the scale of points. Agric. Gaz. New South Wales 33: 714-718. 1922.—The following points are discussed: trueness to type, freedom from disease, evenness, cleanliness, condition and appearance, and apparent yield.—*L. R. Waldron*.

1538. BECKETT, EDWIN. *Potatoes, with a chapter on the artichoke.* 31 p. Country Life: London; Charles Scribner's Sons: New York, 1922.—A brief consideration of the subject in 10 chapters, covering history and general notes; the most suitable soils and their preparation; time and methods of planting, harvesting, and storing; raising in hot beds and cold frames; exhibition work; seed selection for new varieties; insect and fungous diseases; and a classification of a few varieties as to season, outdoor, bed and frame, and exhibition purposes. A final chapter is devoted to the artichoke, covering briefly its history, planting, harvesting, varieties, and preparation for the table.—*P. L. Ricker.*

1539. BEVERIDGE, WM. *Weather and harvest cycles.* *Economic Jour.* 31: 429-452. 1921.—Detailed harmonic analysis of data on the price of wheat in Western Europe during the 300 year period 1500-1869 discloses about 20 distinct cyclic periods varying in length from 2.2 to 68 years. When 11 of the most pronounced of these cycles are combined into a single "synthetic" curve and this curve projected through the years since 1850 it is found that this hypothetical projection synchronizes very closely with a similar curve for rainfall during that period. Especial significance is attached to the fact that the depressions in the price curve are followed by periods of lack of rain, lack of rain being generally beneficial to wheat in the area under discussion. The investigator believes that periodicity in weather exists, although he does not consider prognostication possible without more elaborate investigation.—*L. W. Kephart.*

1540. BOLLEY, H. L. *Potatoes, varieties for North Dakota.* [In: *Potato hand book.*] North Dakota Agric. Exp. Sta. Ext. Div. Circ. 50. 2-7, 3 fig. 1922.—Points in selecting varieties and the best varieties for the state are considered, followed by notes on the merits of other varieties.—*P. L. Ricker.*

1541. BREAKWELL, E., and G. G. ST. CLAIR POTTS. *Sudan grass.* New South Wales Dept. Agric. Farmers' Bull. 126. 17 p., 4 fig. 1919.—Sudan grass was introduced into New South Wales in 1913. It is adapted to all localities below 3000 feet elevation but thrives best along the coast and under irrigation. At Nyngan it has matured seed and attained a height of 5 feet on less than 4 inches of rain. Sudan grass has generally greatly outclassed millets in yield. It responds very readily to fertilizers. Perennial strains of Sudan grass have been reported from 2 localities. Cultural notes are given.—*L. R. Waldron.*

1542. BURGESS, J. L. *Limestone in relation to agriculture.* Part 1. *Limestone and soil fertility.* Part 2. *Future of the agricultural lime industry.* Bull. North Carolina Dept. Agric. 1922: 1-24. Sept. 1922.—This is a revision of Bull. 9 (whole number 265) 1919, and contains no new material. It is published also in *Rock Products* 22: Nov. 1919.—*F. A. Wolf.*

1543. BURSE, W. *Möglichkeiten und Ziele für den deutschen Tabakbau.* [Possibilities and aims for German tobacco culture.] *Mitteil. Deutsch. Landw. Ges.* 37: 602-605, 616-618. 1922.—The author points out that the most important matter is improvement in the quality of German-grown tobacco. Some of the problems of selection, breeding, soils, and fertilizers are discussed.—*A. J. Pieters.*

1544. BUSS. *Ein Beitrag zur Futterpflanzenzüchtung.* [A contribution to the breeding of forage plants.] *Mitteil. Deutsch. Landw. Ges.* 37: 443-445. 1922.—A general statement of methods and of difficulties is presented. Isolation of selections in the field has proved more satisfactory than caging. Vegetative reproduction where possible is an effective method of preliminary increase.—*A. J. Pieters.*

1545. CALVINO, M. *El cultivo herbáceas de una planta arbórea para producir abono verde.* [Cultivation of an arboreal plant to produce green manure.] *Mem. Soc. Cubana Hist. Nat.* "Felipe Poey" 4: 32-43. Pl. 1. 1922.—The author discusses the value of *Cassia siamese*, Lamk. as a source of green manure and recommends its use for reforestation. He also calls attention to *Albizia lebbek*, Benth. and *Prosopis juliflora* (Sw., E. DC.) for similar purposes.—*J. A. Faris.*

1546. CHAMBLISS, C. E. Wild rice. U. S. Dept. Agric. Dept. Circ. 229. 16 p., 2 fig. 1922.—Wild rice (*Zizania aquatica* L. and *Z. palustris* L.), which is distantly related to cultivated rice, is the principal food of wild ducks and other waterfowl and is used to a limited extent by man. A discussion of the growing of wild rice is given.—*L. R. Hesler*.

1547. CHEEL, E. The weeds of civilization. Australian Nat. 5: 25-28. 1922.—The author tells how the weeds were introduced and gives the names of some of the more common ones. *Leucaena glauca* Benth. causes horses to lose the hair of the mane and tail, and causes pigs to lose all hair.—*T. C. Frye*.

1548. CHOMLEY, F. G., and F. A. CHAFFEY. Producing lucerne hay under irrigation. Methods and experiences at Yanco experiment farm. New South Wales Dept. Agric. Farmers' Bull. 143. 22 p., 19 fig. 1921. [See Bot. Absts. 11, Entry 19.]

1549. CHRISTENSEN, ANTON. Intryk fra Islands Landbrug. [The agriculture of Iceland.] Tidsskr. Landokonomi 1922: 261-293. 1922.—The island appears to have little future as an agricultural country since grass crops are not produced to any extent because of the rigorous climate. Iceland is better adapted to raising cattle and sheep, as the climate is well suited to the production of hay. Potatoes, cabbage, and turnips make good growth.—*Albert A. Hansen*.

1550. CONNER, A. B., and R. E. KARPER. Shelling percentage in grain sorghum. Texas Agric. Exp. Sta. Bull. 294. 2 p. 1922.—Sixty million bushels of grain sorghum are produced annually in Texas. The data extend over a period of 6 years. The grain content of the heads varies from 69.53 to 75.23 per cent, or from 1390 to 1504 pounds to the ton of heads. Individual strains show considerable variation.—*L. Pace*.

1551. COPLAND, D. B. Wheat production in New Zealand. Chapter on Improvement in wheat by selection in New Zealand by F. W. HILGENDORF. Introduction by JAMES HIGHT. xx + 311 p. Whitcombe & Tombe, Ltd.: Auckland and London, 1921 (?).—This is mainly an economic treatise published "in the hope that it may help to form a sound public opinion on an industry which has for the last few years been thrust unpleasantly into public notice through the shortage of home-grown supplies of wheat, difficulties of importation, high prices, and the inconveniences of government regulation." Consumption, production, quality improvement and prices of wheat, general conditions, history, periods, cost of production, and other related topics are considered. In the chapter on improvement the methods of developing and introducing pure strains of wheat are outlined. "College Hunter's," a pure line of Hunter's (one of the important wheats of New Zealand) has been introduced. Preliminary trials indicate that it yields 4 bushels per acre more than the commercial seed. Promising strains of this and other varieties are still under trial.—*C. E. Leighty*.

1552. COUEY, WORTH G. The potato seed plot. [In: Potato hand book.] North Dakota Agric. Exp. Sta. Ext. Div. Circ. 50. 19-21. 1922.—Preparation of the seed plot, planting, and inspection for diseases are discussed.—*P. L. Ricker*.

1553. DAVIDSON, W. D. Profitable potato growing. Jour. Dept. Agric. Ireland 22: 140-149. 2 fig. 1922.—Recommendations are detailed for improving the current Irish methods.—*Donald Folsom*.

1554. DIETRICH, F. O. Zur Phosphorsäurefrage. [The phosphoric acid question.] Mitteil. Deutsch. Landw. Ges. 37: 600-602. 1922.—In this general statement regarding the necessity of phosphates, the author refers to some of the important papers but adds no new data.—*A. J. Pieters*.

1555. DOBRESCU, I. M. Le climat et la blé roumain. (Das Klima und der rumanische Weizen.) [Climate and Roumanian wheat.] Bull. Soc. Științe Cluj 1: 171-176. 1921.—The

Roumanian soils as well as the climate are well suited to the culture of wheat. The author inquires in how far the climate influences wheat yields. He establishes the fact that the quantity of the crop depends on the intensity of assimilation before blooming time, which means for Wallachia before the end of May and for Moldavia by the middle of June. This assimilation is again dependent on the water content of the soil and consequently on the rainfall. The quality of the crop on the other hand is controlled by the light and temperature relations during the formation of the kernels, thus favored by dry, warm weather from blooming to maturity. According to the writer, these favorable conditions obtain all over Roumania, but especially in the neighborhood of Cluj and Botoşani.—*M. Tiesenhausen.*

1556. EASTERBY, H. T. Sugar experiment bureau. Summary of 21 years' work. (Continued.) Part IV. Australian Sugar Jour. 14: 408-412. 1922.—A résumé is given of results of experiments started in 1905 at Mackay to determine the most suitable distances between the plants in the row and the width between the cane rows. Plants only 6 inches apart in the row yielded over 11 tons of cane more per acre than when grown 36 inches apart. Cane from rows planted 4 feet apart gave 20 tons per acre more than when rows were 7 feet apart. Also the yield of sugar per acre was greater for the thicker planting. The variation in distance between the rows had a much more definite bearing upon the crop results than the variation of distance between the plants. Soils and climatic conditions have an influence on these results.—*C. Rumbold.*

1557. EASTERBY, H. T. Sugar experiment bureau. Summary of 21 years' work. (Continued.) Part V. Australian Sugar Jour. 14: 479-483. 1922.—There has been a constant introduction and testing of cane varieties at the Mackay Sugar Experiment Station since 1895. They are tested by cropping and chemical analyses. Two of these introduced canes; New Guinea 15 or Badila and N. G. 24 or Goru, are very valuable. The results of the tests in yield of cane and of sugar for these 2 and other canes are given in tables.—*C. Rumbold.*

1558. EASTGATE, J. E. How I grow potatoes in eastern North Dakota. [In: Potato hand book.] North Dakota Agric. Exp. Sta. Ext. Div. Circ. 50. 8-10, 2 fig. 1922.—Time and method of preparing the soil, treatment and planting of seed potatoes, cultivation, harvesting, and loading for the market are discussed.—*P. L. Ricker.*

1559. FINKE, H. L. Potato culture in northwest North Dakota. [In: Potato hand book. North Dakota Agric. Exp. Sta. Ext. Div. Circ. 50. 10-11. 1922.—Details are given of soil preparation, cultivation, and spraying.—*P. L. Ricker.*

1560. FISCHER, HERMANN. Über den Einfluss der Humussäuren auf unsere Kulturpflanzen. [Concerning the effect of humus acids on our cultivated plants.] Mitteil. Deutsch. Landw. Ges. 37: 559. 1922.—The author describes certain effects of humus acids such as the wrinkled, brown spotted leaves of beans and the pale green color of oats, barley, peas, and vetches. Pear leaves become folded and leaves of apple become brown spotted and dry from the margin toward the middle. These effects are said to be due to physiological drying, the plants producing few root hairs and absorbing little of the acid solution.—*A. J. Pieters.*

1561. FRANCK, W. J. Algemeene gezichtspunten betreffende unificatie van de methoden van zaadenderzoek in het belang van den handel, meer speciaal met betrekking tot de zuiverheid van het zaad. [General views on unification of methods in seed testing as to its importance for the trade, and especially with relation to the purity of seed.] Cultura 34: 270-280. 1922.—In recent years much stress has been laid by the seed trade upon uniformity in methods of seed control. In the Netherlands at first the Irish, later the continental system, was used. In the seed trade of the Netherlands the following formula has been much in use: $\text{usefulness} = \frac{\text{purity} \times \text{germinating power}}{100} - 3 \times \text{harmful impurity}$. The writer suggests that in accordance

with his predecessor, F. F. Bruijning, a uniform international technique and system for seed testing should be adopted, and the term grade should be used, since this word is practically the same in all languages.—*J. C. Th. Uphof.*

1562. GASSER, G. W. Report of work at Rampart station. Rept. Alaska Agric. Exp. Sta. 1920: 20-36. Pl. 2-3. 1922.—The report shows that late spring and cool summer nearly resulted in crop failure. Alaska peas were grown both for hay and seed. Oats were also used for hay. *Medicago falcata* is the only hardy alfalfa. *Vicia cracca* and *Trifolium lupinaster* are hardy. Reports are made on spring wheats, oats, and barley, including well known types and many hybrids originated at the station. Hemp and buckwheat ripened 25 per cent of seed while flax ripened only 2 per cent. Turnips, rutabagas, cabbage, and peas ripened seed, but carrots and sugar beets did not. Potatoes in variety were grown, also the following vegetables; pe-tsai lettuce, Swiss chard, carrots, beets, sugar beets, parsnips, spinach, beans, peas, tomatoes, cabbage, cauliflower, turnips, and celery. One head of Copenhagen Market cabbage weighed 27 pounds. Pepper, egg plant, cucumber, and muskmelon were started in the greenhouse and grown in cold frames. Hybrid strawberries from Sitka station produced fruit. Notes on flowering plants are given.—J. P. Anderson.

1563. GERLACH und KÜNTZEL. Über die Aufbewahrung der grünen, wasserreichen Futterpflanzen und der wasserhaltigen Abfallprodukte landwirtschaftlicher Nebengewebe. [Concerning the preservation of green succulent fodder plants and of the succulent waste products of agricultural industry.] Mitteil. Deutsch. Landw. Ges. 37: 630-637. 1922.—The authors describe the various forms of containers in which plant material is preserved. The common unwallled pit is not satisfactory nor is the walled pit as good as the other types, 5 of which are described in some detail, namely, fermentation chambers, German feed tower, peasants silo (Bauernsilo), American feed tower, and electro-feed container. Reference is made to firms dealing in these various types. The authors also discuss under 7 heads the essentials to be observed in the construction of such containers. A bibliography is appended.—A. J. Pieters.

1564. GRAHAM, I. D., and T. D. HAMMATT. Some factors in agricultural cost production. Trans. Kansas Acad. Sci. 30: 225-232. 1919/1921 [1922].—The purpose of this paper is to give in detail the facts which are absolutely necessary in the determination of any reliable statistics concerning 'a] farm crop, including particularly land and buildings, use of machinery, seed, seed bed preparation, harvesting, threshing, hauling to market, insurance, fertilizer, interest on seed and seed bed, crop risk, rent, management, and credit by straw and pasture.—F. C. Gates.

1565. HANSEN, K. Planteavlten 1920. [The harvest, 1920.] Tidsskr. Landokonomi 1921: 421-443. 1921.—An estimate is made of the acreage of the staple crops in Denmark during 1920. A large acreage was seeded to peas for cattle feed and the majority of the root crops were grown for cattle feeding. Potatoes were exported to a limited extent, but the freight rates were too high to permit extensive exportation. During the world war the production of seed crops was highly developed but the production of seed dropped considerably after the war. The 1920 harvest is discussed and statistics presented.—Albert A. Hansen.

1566. HARLAN, H. V., M. N. POPE, and L. C. AICHER. Trebi barley, a superior variety for irrigated land. U. S. Dept. Agric. Dept. Circ. 208. 8 p. 1922.—Trebi barley, a 6-rowed, bearded variety, is a pure line descended from selection of a single plant. Introduced from Asiatic Turkey it is being distributed to American farmers. It is especially adapted to irrigated land in southern Idaho and is recommended for irrigated lands where the summer season is similar to that of southern Idaho. It is not recommended for non-irrigated lands.—L. R. Hesler.

1567. HAUTEN, A. VAN. Einwirkung verschiedener Düngemittel auf Vietsbohnen. [Action of different fertilizers upon the kidney bean.] Jour. Landw. 70: 1-7. 1921.—The effects of the fertilizer combinations, K, N, P_2O_5 , $K + P_2O_5 + N$, $K + N$, $K + P_2O_5$, and $P_2O_5 + N$ upon the growth and yield of the kidney bean are described. Chemical analyses of the ash and the dry substance show that the plants required little N and P_2O_5 , while the need for K was very great. Plots fertilized with K gave the greatest yields, as well as high starch, fat, and ash content.—F. M. Schertz.

1568. HAYWOOD, A. H. The culture of sugar cane in New South Wales. New South Wales Dept. Agric. Farmers' Bull. 139. 36 p., 12 fig. 1921. [See Bot. Absts. 9, Entry 612.]

1569. HOFFMAN, M., und O. NOLTE. Düngungsversuche mit Stickstoffdüngern. [Fertilizer experiments with nitrogenous fertilizers.] Mitteil. Deutsch. Landw. Ges. 37: 540. 1922.—The authors report on a test of nitrogenous fertilizers carried on by cooperating farmers. A tabulated statement of returns from the use of sodium nitrate, ammonium sulphate, ammonium chloride, ammonium sulphate-nitrate (ammoniumsulphat salpeter), and ammonium-potassium nitrate on rye, winter wheat, oats, and potatoes shows that the various fertilizers had practically equal value.—A. J. Pieters.

1570. HOFFMAN, und O. NOLTE. Düngungsversuche mit verschiedenen Kali-Salzen zu Kartoffeln im Jahre 1921. [Fertilizer investigations with various potash salts on potatoes in the year 1921.] Mitteil. Deutsch. Landw. Ges. 37: 497-498. 1922.—Potassium magnesium sulphate, potassium sulphate, and 40 per cent potassium nitrate were tested. In general the yields were greater after using the first.—A. J. Pieters.

1571. HOFFMAN, M., und O. NOLTE. Vergleichende Phosphorsäuredüngungsversuche. [Comparative fertilizer experiments with phosphoric acid.] Mitteil. Deutsch. Landw. Ges. 37: 442-443. 1922.—A comparison of Thomas meal containing 15 per cent citric acid-soluble phosphoric acid and Rhenaniaphosphate containing 11 per cent on rye, barley, oats, and sugar beets showed that the 2 forms were of equal value.—A. J. Pieters.

1572. HOYER, JAMES. Det kgl. danske Landhusholdningsselskabs Kontrol med Korn og Foderstoffer i Kobenhavns Frihavn i Aaret 1921. [The Royal Danish Agricultural Society's control of importing grain and feed into Copenhagen's Free Harbor during the year 1921.] Tidsskr. Landøkonomi 1922: 191-198. 1922.—The author presents numerous tables and discusses the relationship of this society to the importation of grain and feed into Denmark during 1921.—Albert A. Hansen.

1573. JONES, J. M., R. A. BREWER, and R. E. DICKSON. Grain sorghums versus corn for fattening baby bees. Texas Agric. Exp. Sta. Bull. 296. 25 p. 1922.—The test continued 165 days. Details of feeding, preparation of the different foods, care of the stock, climate, and other data are given. The steers fed on grain sorghums, made more economical gains than did those fed on corn.—L. Pace.

1574. KARPEN, R. E. Varieties of cotton in northwest Texas. Texas Agric. Exp. Sta. Bull. 299. 26 p. 1922.—The author reports experiments from 1912 to 1921 at Substation 8, near Lubbock, Texas, about the center of the south Plains region.—Cotton production in the counties wholly or partly in the Plains increased from 9,240 bales in 1909 to 132,489 in 1919. This is due to the selection of varieties better suited for general culture in this locality, to the arrival of cotton growers from the eastern southern states, to freedom from boll weevil, and to the greater amount of land available for cultivation. Cotton has proved one of the most drought-resistant crops for this section. A table shows the precipitation for the period with a minimum of 8.73 inches in 1917 and a maximum of 31.88 in 1915. In 2 other years there was a precipitation of over 31 inches, but all others had less than 20, which, however, was fairly well distributed in spring and summer.—L. Pace.

1575. KIESSLING. Einige Gegenwartsfragen der Pflanzenzüchtung und des Saatbaues. [Some present questions of plant breeding and seed growing.] Mitteil. Deutsch. Landw. Ges. 37: 454-458. 1922.—In this address the author discusses the selection of pure strains out of mixed populations, selection of mutations, and crossing. Most of the improvement work thus far has been by the 1st method though the author believes that crossing holds great possibilities. Special mention was made of the need for breeding, among others, forage crops, clovers, grasses, and vetches. The establishment of gardens for preserving all old varieties

was urged since such varieties may prove useful in breeding. Potato selection was discussed at length and requirements proposed to be met before new varieties might be registered. Suggestions were made regarding the distribution of improved seed.—*A. J. Pieters.*

1576. MATENAERS, F. F. *Neuere Erfahrungen mit der Sonnenblumensilage.* [New experiences with sunflower silage.] *Mitteil. Deutsch. Landw. Ges.* 37: 499-500. 1922.—The author briefly reviews recent work on sunflower silage in the U. S. A., and especially in Montana.—*A. J. Pieters.*

1577. MOODIE, A. W. S. *Field experiments with maize. Grafton experiment farm, 1921-22.* *Agric. Gaz. New South Wales* 33: 709-713. 1922.—Work was done with the Icaming variety. Data upon residual fertilizer effect showed that superphosphate applied Nov. 1919, resulted in a net gain of \$4.25 per acre over no fertilizer and superphosphate applied each year gave a net gain of \$5.40 per acre over no manure, for the crop of 1922.—Time of plowing trials showed a net gain of \$8.65 per acre for the early (winter) plowing over the late (spring) plowing.—Cultivation carried on to tasseling time showed a net gain of \$3.50 per acre in comparison with only 1 cultivation after hilling.—In a comparison of hilling with flat cultivation the average net loss for hilling was \$3.72 per acre.—In a desuckering trial, maize plants were grown individually 12 inches apart in rows 4 feet apart. The maize was planted Oct. 26 and was desuckered Jan. 11. The amount of suckering was heavy. The net loss to the crop from desuckering was \$6.68 per acre; allowance was made for the forage value of the suckers.—*L. R. Waldron.*

1578. MUNTEANU, ANASTASE V. C. *Contribuțiuni la Ameliorarea grâului românesc.* (Teze). [Contribution to the improvement of Roumanian grains. (Thesis)] 94 p., 8 pl. *Cartea Românească*: Cluj, 1922.—The author first discusses the present condition of wheat breeding, then methods used in his work. He started with the commonly esteemed domestic variety "Grâul bălan românesc" of *Triticum vulgare erythrospermum*, of which the botanical and biological characters are given. After 6 years' selection the author secured a type which, besides being highly resistant to rust and lodging, yields 18 per cent more than the parent type. In order to further improve the plants studied, hybridization as well as selection was used. Crossing Line No. 148 with Strubes square head and with Mettes square head, the author secured 6 crosses, all of which exceeded the pure line No. 148 in real value. One of these crosses was grown on 2 hectares with gratifying results. Many tables are included.—*M. Tiesenhausen.*

1579. NEWTON, W. *Forage crops for the Lower Fraser Valley.* *Agric. Jour. [British Columbia]* 7: 36-37. 1922.—In this address varieties of clover are discussed and white Dutch advocated for burned over pasture lands. The use of silage, particularly clover silage, is recommended and the trench silo described. A mixture of orchard grass, tall oats, and meadow fescue is recommended as desirable and timothy declared particularly valuable on the poorly drained delta soils. Intertillage crops and root crops are included in the discussion and mangels designated as the leading root crop for the dairymen of the region under consideration.—*Mary R. Burr.*

1580. NOBLE, E. G. *The work of the Yuma reclamation project experiment farm in 1919 and 1920.* U. S. Dept. Agric. Dept. Circ. 221. 37 p., 10 fig. 1922.—This reports crop experiments on cotton, alfalfa, sorghums, wheat, flax, legumes, orchard fruits, and vegetables.—*L. R. Hesler.*

1581. OBERSTEIN. *Farbmutationen der Kartoffelschalenfarbe.* [Color mutations of potato skin color.] *Mitteil. Deutsch. Landw. Ges.* 37: 666. 1922.—The author describes a tuber mutation in which the color of the tubers was piebald, the boundaries of the white and red color being sharply defined and differing in arrangement in different tubers.—*A. J. Pieters.*

1582. PARK, J. B., C. J. WILLARD, and H. L. BORST. Growing soybeans in corn. Ohio Agric. Exp. Sta. Monthly Bull. 7: 75-78. 1922.—This is a report of 3 years' experience in growing corn and soy beans in combination. It has been found practical to drill the corn and soy beans in the same row and at the same time. The test suggests that the poorer the soil in organic matter and nitrogen the more likely the combination is to out-yield the corn alone, while on rich soil the reverse is true. Suggestions are given regarding the time of planting, also rate and distance of planting. The Peking, Virginia, and Wilson varieties proved especially useful for this practice.—*R. C. Thomas.*

1583. PETERSEN, K. DOLPH. Beretning fra Statsfrokontrollen fra 1 Juli 1920 til 30 June 1921. [Report of state seed control from July 1, 1920, to June 30, 1921.] Tidsskr. Planteavl 28: 129-175. 1922.—Of the 26,922 samples of seed tested, 15,928 were for dealers, 10,271 for growers, and 753 for the state. Samples were received from all parts of Europe and from the U. S. A. The principal kinds were grains, grasses, peas, and beets. The samples were tested for weed seeds, diseases, germination, weight, and water content. Dealers are required to make certain guarantees regarding purity and germination; if the seed does not meet the guarantee an indemnity must be paid, the amount of which is determined by the Board of Seed Control.—*Albert A. Hansen.*

1584. PITT, J. M. Last season's maize yielding contests. The lower north coast. Agric. Gaz. New South Wales 33: 695-702. 1922.—Yields are given for various varieties at different localities.—*L. R. Waldron.*

1585. RADER, F. E. Report of work at Matanuska station. Rept. Alaska Agric. Exp. Sta. 1920: 48-58. Pl. 6-8. 1922.—Rye wintered perfectly. Of spring grains, several varieties each of barley, wheat, and oats were grown. Some varieties of each ripened and produced well, but others were only partly ripe when frosted Sept. 23. Sunflowers for silage did not do well. Smooth brome grass, Kentucky blue grass, timothy, and meadow fescue wintered well; but orchard grass, reedtop, Italian rye grass, English rye grass, and crested dogs-tail mostly winter-killed. About 40 per cent of Grimm alfalfa survived the winter, but common and Turkestan alfalfas were killed. A few red clover plants and not over 50 per cent of white clover survived the winter. Canada field peas ripened very little seed. Of 40 varieties of potato grown 7 are recommended. The highest yield approached 425 bushels per acre. Seedling potatoes from the Sitka station were also tested. Sugar beets and other root crops gave fair results. All apple trees planted in 1918 had died. Red and black currants produced good crops, but gooseberries and red raspberries froze back considerably. A strawberry bed was killed by ice cap due to lack of drainage. Tartarian honeysuckle and *Rosa rugosa* are recommended. Small fruit plants are being grown for distribution among settlers of the region. The usual hardy vegetables were grown.—*J. P. Anderson.*

1586. RATCLIFFE, GEORGE T. The work of the San Antonio experiment farm in 1919 and 1920. U. S. Dept. Agric. Circ. 209. 39 p. 1922.—The author reports on rotation, tillage, and similar practices; on crops, including cotton, corn, sorghums, small grains, field peas, flax, Rhodes grass, peaches, plums, jujube (the Chinese date, *Zizyphus* sp.), Japanese persimmons, apricot, pecan, citrus, etc., and on cotton root-rot.—*L. R. Hesler.*

1587. REICHELT. Ergebnis eines dreijährigen Anbauversuchs mit zwei Spätkarottensorten. [Results of a 3-year culture test with late carrots.] Mitteil. Deutsch. Landw. Ges. 37: 471. 1922.—The results of tests of 2 late varieties of carrots made at various stations are reported, Long Red Sudenburger giving best yields.—*A. J. Pieters.*

1588. REYNOLDS, MARK H. Farmers' experiment plots. Maize experiments 1921-22. North-western district. Agric. Gaz. New South Wales 33: 703-707. 1 fig. 1921.—Experiments were conducted upon 11 private farms, 20 varieties being used. Minnesota 23 grown at Guyra gave the maximum yield of 61.3 bushels per acre. A limited number of manurial trials were carried out.—*L. R. Waldron.*

1589. REYNOLDS, MARK H. Farmers' experiment plots. Potato experiments, 1921-22. New England district. Agric. Gaz. New South Wales 33: 729-731. 1922.—The experiments were conducted cooperatively with 9 farmers. The variety Factor yielded highest at 8 points. The greatest fertilizer returns were obtained from plots comprising land recently broken from pasture or from land not recently cropped to potatoes. Plots continuously cropped to potatoes without fertilizer did not respond profitably to fertilizer application.—*L. R. Waldron.*

1590. REYNOLDS, MARK H. Fodder crops for dairy farmers. Northern tablelands. Agric. Gaz. New South Wales 33: 725-726. 1922.—The article discusses best fodder crops for the various zones in this district.—*L. R. Waldron.*

1591. RICHTHOFEN, VON. Bodengare unter Berücksichtigung der Stallmistdüngung. [Manuring with stable manure.] Mitteil. Deutsch. Landw. Ges. 37: 670-674. 1922.—The author advocates spreading manure in winter on fall-plowed land. The number of soil bacteria is said to have been increased and the yield of potatoes to have been much improved by this method.—*A. J. Pieters.*

1592. ROSSEM, C. VAN. Bemestings-, nawerkings- en vruchtwisselingsproeven op Java en ter Oostkust van Sumatra. Verslag over den Westmoesson 1918-1919. [Fertilizer, fertilizer after-effect, and crop-rotation tests in Java and the East Coast of Sumatra. Report for the west monsoon 1918-1919.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Alg. Proefsta. Landb. Mededeel. 5. 109 p. 1920.—Pages 9-16 summarize the results of these tests. The remainder of the publication is devoted to a detailed description of the same tests.—*Carl Hartley.*

1593. ROSSEM, C. VAN. Bemestings-, nawerkings- en vruchtwisselingsproeven op Java en Sumatra. Verslag over den Westmoesson 1919-1920. [Fertilizer, fertilizer after-effect, and rotation tests in Java and Sumatra. Report for 1919-1920.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Alg. Proefsta. Landb. Mededeel. 10. 119 p. 1921.—This article gives tests of commercial fertilizers, stable manure, and green manures on rice. In addition 6 fertilizer tests with potatoes and 1 with corn are reported; also 5 rotation experiments. A general survey of the results is given in pages 9-16.—*Carl Hartley.*

1594. ROSSEM, C. VAN. Bemestingsproeven in den proeftuin. Verslag over het jaar 1918, tevens samenvatting van de resultaten met die der voorafgaande jaren. [Fertilizer experiments and report for 1918 together with a summary of the results of previous years.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Alg. Proefsta. Landb. Mededeel. 2. 41 p. 1919.—Extensive comparisons are made of various artificial manures with regard to their effect on the production of rice. In 6 tests calcium nitrate had about the same effect as ammonium sulphate while both were more favorable than Chili saltpeter. Sulphuric acid appeared to have no influence on rice production. Calcium carbonate increased the yield. Chili saltpeter and ammonium sulphate were compared in production of cassava and the results showed that the former used singly or in combination with superphosphate gave the highest yields.—*R. D. Rands.*

1595. ROSSEM C. VAN. Bemestingsproeven in den proeftuin. Verslag over het jaar 1919. [Fertilizer tests in the experimental grounds. Report for the year 1919.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Alg. Proefsta. Landb. Mededeel. 6. 31 p. 1921.—Experiments at Buitenzorg are reported. The addition of sulphuric acid 5 successive times on the same field, in quantities equivalent to 270, 540, and 740 pounds of ammonium sulphate per acre, has failed to show any definite effects on rice production. With superphosphate 3 or 4 applications, and with ammonium sulphate 4 applications, were more advantageous than the same amounts of these fertilizers added in a smaller number of applications. Calcium carbonate increased rice production. Three years' tests indicate that for cassava, Chili nitrate, either alone or with phosphates, is more valuable than ammonium sulphate used in the same way.—*Carl Hartley.*

1596. RUSSELL, G. A. Peppermint on muck soil. Jour. Amer. Peat Soc. 15⁴: 15-22. 1922.—Peppermint is successfully grown on muck soils in Indiana and Michigan.—G. B. Rigg.

1597. SCHEUERMANN, R. Zur Frage der Ringelkletten in deutschen Wollen. [On the question of bur clovers in German wool.] Mitteil. Deutsch. Landw. Ges. 37: 572-573. 1922.—The author points out that introduced plants do not establish themselves in Germany. *Xanthium spinosum* is said to have entirely disappeared from the vicinity of Döhren during the war when the supply of foreign wool was cut off. The author suggests that pollinating agents are wanting because fertile seed are seldom found on the weeds introduced with wool. Several species of *Medicago*, especially *M. minima*, are mentioned as having been found near wool-cleaning factories. The distribution of this species in Germany is given and it is concluded that there is no danger of this plant becoming a serious pest.—A. J. Pieters.

1598. SCHULTZE, ERNST. Die Zerrüttung der Weltwirtschaft. [The break down of world trade.] 370 p. W. Kohlhammer; Stuttgart, 1922.—Agricultural interests are barely touched upon in the discussion of raw materials. The author is most interested in exchange, railway and steamboat matters, coal, petroleum, industry in general, and trade balances.—A. J. Pieters.

1599. SNELL, K. Die Gruppierung unserer Kartoffelsorten nach bestimmten Typen. [The grouping of our potato varieties according to certain types.] Mitteil. Deutsch. Landw. Ges. 37: 445-446. 1922.—The grouping of varieties by stem and foliage characters is very difficult; a few examples are given. A grouping by tubers has been carried out under the auspices of the Deutsche Landwirtschafts Gesellschaft. In 1914, Schifftan in his "Almanac" made such a grouping, and the present writer in Heft 5 of Arbeit. Forschungsinst. Kartoffelbau has grouped the newer varieties, utilizing the following characters: (1) color of skin (white or colored); (2) color of flesh (white or yellow); (3) form of tuber (round or long); (4) color of light sprout (green, red, or blue violet); (5) color of flower (white, red, or blue violet).—A. J. Pieters.

1600. SNODGRASS, M. D. Report of work at Fairbanks station. Rept. Alaska Agric. Exp. Sta. 1920: 36-48. Pl. 4-5. 1922.—A drought following the dry season of 1919 was severely felt. Romanow and Chogot wheats grown on land that produced 30 and 27 bushels per acre in 1919 produced 6 and 4 bushels respectively. Five other varieties of wheat were grown in test plots. Average yield of wheat on farms in the vicinity was about 15 bushels. Report is made on tests of oat and barley varieties. Buckwheat was a success. Peas were grown for seed, grain for hay. Fourteen varieties of potatoes averaged 82 bushels per acre. Yield of root crops was light. Alfalfa and red clover wintered well being protected by a heavy snowfall. Except red currants, native fruits were abundant. Red raspberries and hybrid strawberries were grown. More than 15 tons of seed grain were distributed among the farmers, mostly by sale or agreement. Cooperative work was carried on.—J. P. Anderson.

1601. STAPLEDON, R. G., R. D. WILLIAMS, KATHLEEN SAMPSON, and T. J. JENKINS. Preliminary investigations with herbage plants. Rept. Welsh Plant Breeding Sta. Univ. Coll. of Wales Aberystwyth 97 p. 1922.—This report covers the results of 3 years' trials with alfalfa, clovers, vetches, and various grasses; growth being discussed under the periods awakening, zenith, gradually waning, rapidly waning, and death. For each species the authors discuss the factors, such as previous cutting, that influence the amount of growth during each period. From a study of flowering in the fall of the seeding year, the authors conclude "that of the species capable of producing heavy Autumn Bites, it is those strains which develop numerous flowering shoots in the seeding year that are most to be desired." Under the heading "Potentiality and Nationality" are reported the success or failure of many species of exotic grasses and legumes, especially clovers, with notes on their probable usefulness in Wales. Notes on fungus diseases are given under each group. Species already more or less widely used in Britain are discussed at greater length, with notes on parasites. The species subject to more exhaustive investigations at Aberystwyth are cocksfoot (*Dactylis glomerata*), Italian and peren-

nial rye grass, a hybrid called "perenital" (*Lolium perenne* \times *L. italicum*), timothy, and tall oat grass. The discussion of the "cocksfoot" and of the rye grasses is especially full, covering the behavior of various strains and nationalities. The author finds that plants of cocksfoot fall into 4 fairly natural growth groups: "dense," "open," "pasture," and "hay." Under clovers, white and red clovers are extensively discussed. The behavior of varieties such as wild white and red clover of various nationalities is reported. In both early and late groups the English red clover gave highest yields, with Chilean 2nd and Canadian 4th. Italian clover proved the most susceptible to anthracnose (*Gloeosporium caulivorum*). There is further a discussion of cyanophoric tests with seedlings and plants of white clover, with reference to the literature. Seed production tests of cocksfoot, perennial rye grass, and timothy are reported. Studies were made and results reported of cross and self-pollination in meadow foxtail, sweet vernal, fine leaved fescues, timothy, rough stalked meadow grass, perennial rye grass, and cocksfoot.—*A. J. Pieters.*

1602. STIEGER. Unsere Pflicht in der Brotversorgung. [Our duty regarding the bread supply.] Mitteil. Deutsch. Landw. Ges. 37: 556-557. 1922.—The author points out that 80-90 per cent of the food value of grains fed to cattle is lost and advocates a more complete use of food grains for direct human consumption.—*A. J. Pieters.*

1603. THATCHER, L. E. Corn and soybeans for silage. Ohio Agric. Exp. Sta. Monthly Bull. 7: 79-81. 1922.—In tabular form accompanied by brief explanation yields of silage from corn alone and from the combination of corn and soy beans in the same hill are given; also drilling and checking methods are compared. Suggestions are made regarding the most advantageous time and method of planting.—*R. C. Thomas.*

1604. THATCHER, L. E. Sunflowers for silage in Ohio. Ohio Agric. Exp. Sta. Monthly Bull. 7: 43-49. 1922.—From the data presented conclusions are not warranted; yet there are indications that in Ohio sunflowers cannot compete with corn for silage. In tabular form are given a comparison of sunflowers and Blue Ridge corn for ensilage, of sunflowers versus corn in drills and hills, a comparison in pounds per acre of dry matter based on a 3-year average yield, also an analysis of fresh cut sunflowers, sunflower silage, and corn silage at the Ohio Experiment Station. The article also includes estimates by a number of farmers who have cooperated in determining the relative value of the 3 forms of ensilage.—*R. C. Thomas.*

1605. THATCHER, L. E. Wheat, cultural notes. Ohio Agric. Exp. Sta. Monthly Bull. 7: 139-143. 1922.—The author discusses important cultural features, such as rate of seeding, date of seeding, and preparation of seed bed. The discussion is supported by tables showing the result of experimental work.—*R. C. Thomas.*

1606. THOMAS, GEORGE. The development of institutions under irrigation; with special reference to early Utah conditions. xi+293 p. Macmillan Co.: New York and London, 1920.—The author discusses the development of irrigation institutions in Utah and undertakes to show how the Mormons coped with the institutional problems of irrigation. Of the first canals the smaller were individual or partnership affairs but the larger were community or cooperative undertakings, which when completed were controlled by a watermaster elected by the people. Soon after the settlement of the territory the legal control of the canal was given to the county courts and later to the county selectmen. Numerous cases tried before the county courts, district courts, and supreme court are cited and discussions given. Various legislative features bearing on irrigation such as the Carey Act and the Reclamation Act are discussed in detail. Considerable attention is given to the development of some of the larger projects within the state.—*H. L. Westover.*

1607. THOMPSON, G. E., and C. J. WOOD. Growing cotton in Arizona. Arizona Agric. Exp. Sta. Bull. 90. 265-275. 1919.—This general discussion refers primarily to American Egyptian cotton.—*Herbert C. Hanson.*

1608. THORN, C. E. Fertilizing the wheat crop in Ohio. Ohio Agric. Exp. Sta. Monthly Bull. 7: 112-121. 1922.—The experiments reported cover all the principal Ohio soil types, and several of the trials have been continued sufficiently long to cover a full cycle of climatic change. On every soil in Ohio where wheat is grown in a rotation of clover, profitable returns will doubtless be realized from a moderate dressing of acid phosphate. On the average soil, muriate of potash will give more than sufficient increase to cover its cost, although there are exceptions, and on a few soils nitrate of soda may be used at a profit provided the demand of the soil for phosphorus has been supplied.—*R. C. Thomas.*

1609. TORNAU, OTTO. Ein Versuch über den Einfluss der Kornschwere des Saatgutes auf den Ertrag bei Hafer. [An experiment on the influence of the weight of seed upon the yield in oats.] Jour. Landw. 69: 205-213. 1921.—The results show that yields were about the same whether large or small grains were planted. On the other hand, the large grains showed superiority in development of the growing plant.—*F. M. Schertz.*

1610. WEBER, HERMANN. Die praktische Kartoffelzüchtung in Kovarce und Udvarnok (Slowakei). [Practical potato breeding in Czechoslovakia.] Oesterr. Zeitschr. Kartoffelbau 2: 21-24. 1922.—The production of new strains and varieties by selection and by hybridization is discussed, and an outline of the author's procedure in producing cross bred seed and care of seedlings and the selection and testing of the latter is given. By transplanting seedlings twice before setting in the field they develop larger root systems. It is stated that by this treatment 1-year seedlings attain size and yield comparable to those of plants grown from tubers.—*F. Weiss.*

1611. WENHOLZ, W. Soil improvement for maize. Part I. Manures and fertilizers. New South Wales Dept. Agric. Farmers' Bull. 134. 36 p. 1920. [See Bot. Absts. 7, Entry 60.]

1612. WENHOLZ, H. The cultivation of maize. New South Wales Dept. Agric. Farmers' Bull. 125. 43 p., 13 fig. 1919.—This bulletin describes in popular manner the preparation of the soil, planting, and after cultivation and treatment. Varieties of maize are not discussed. Desuckering a crop at Bathurst resulted in a loss of 21 bushels of grain per acre over the control. Detasseling to increase yield is not recommended. "Topping" of maize (removal of the stalk above the cob for the fodder after the grain has begun to set) is not regarded as an economical practice.—*L. R. Waldron.*

1613. WHITE, W. T. Report of work at Kodiak station. Rept. Alaska Agric. Exp. Sta. 1920: 58-63. 1922.—Reports are given on grains and forage plants which are being grown for silage, etc. None of the crops did as well as usual. Silage is also made of sedge (*Carex cryptocarpa*) with small admixture of beach rye (*Elymus mollis*). Between 60 and 65 tons of hay were made from native bluetop (*Calamagrostis Langsdorfii*). Grimm alfalfa, yellow flowered alfalfa (*Medicago falcata*), sweet clovers (*Melilotus alba* and *M. officinalis*), red clover, vetch (*Vicia sativa*), rape, and Canada field peas were grown but did not do well, due largely to an excessive number of cool, cloudy days.—*J. P. Anderson.*

1614. WILLARD, C. J., and H. L. BORST. Scarifying Ohio sweet clover. Ohio Agric. Exp. Sta. Monthly Bull. 7: 62. 1922.—Although it is claimed that Ohio sweet clover seed does not require scarifying, the authors report excellent results with the Ames huller and scarifier. Samples originally germinating at the rate of 31-90 per cent containing from 1 to 43 per cent hard seed before scarification, averaged 81 per cent of germination afterwards. These results were further verified in field tests.—*R. C. Thomas.*

1615. ZIELSTORFF, W. Über Zusammensetzung und Futterwert von eingesäuertem Kartoffelkraut. [On the composition and feeding value of ensiled potato herbage.] Mitteil. Deutsch. Landw. Ges. 37: 693-694. 1922.—Owing to wet weather the herbage on a field of

potatoes grew rank and remained green at the end of September. This herbage was cut and ensiled. Analyses of fresh material and of the silage showed that in the upper layers there was a 38 per cent loss in organic matter and 25 per cent in the lower layers. In feeding tests this silage was used to replace mangels in the standard feed. Potato silage had about the same feeding value as mangels, as shown by total milk production and percentage of butter fat.—*A. J. Pieters.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 1663, 1671, 1789, 1883, 1900, 1963, 2007, 2066, 2074, 2107, 2211, 2218)

1616. ANONYMOUS. Dr. Joel Lunell. *Amer. Midland Nat.* 5: 243-245. *Frontispiece*. 1920.—This reviews the life and significant works, with the names of some of the publications, of this man of very wide interests, including systematic botany.—*Sister M. Ellen.*

1617. ANONYMOUS. Dr. Joseph Trimble Rothrock dead. *Amer. Forestry* 28: 414. 1922.

1618. ANONYMOUS. Franklin B. Hough—a tribute. *Amer. Forestry* 28: 431-432. *Portrait*. 1922.—Notes from the biography of the "Father of American Forestry" are given on the occasion of the centennial anniversary of his birth.—*Chas. H. Otis.*

1619. ANONYMOUS. Obituary notice. *Trans. and Proc. Bot. Soc. Edinburgh* 27: 344-345. 1919.—A brief sketch and appreciation are given of William Brack Boyd (1831-1918), a former president of the Edinburgh Botanical Society.—*Roxana Stinchfield Ferris.*

1620. ANONYMOUS. Referater af fremmed litteratur. [Reference to foreign literature.] *Tidsskr. Planteavl* 28: 176-184. 1922.—This is a collection of abstracts of important foreign agricultural contributions.—*Albert A. Hansen.*

1621. ANONYMOUS. Sir Frederick Moore. *Gard. Chron.* 71: 322-323. 1922.—This article gives an appreciation and brief biographical sketch following Moore's retirement from the directorship of the Royal Glasnevin Botanical Garden.—*P. L. Ricker.*

1622. ANONYMOUS. Scientific activities in the United States; a biologist's view. [Rev. of: CAULLERY, MAURICE. *Universities and scientific life in the United States*. Translated by: WOODS, JAMES H., and EMMET RUSSELL. *xvii + 269 p.* Harvard University Press: Cambridge, Massachusetts; Oxford University Press: London, 1922.] *Nature* 110: 72-73. 1922.—This book "gives a remarkably lucid and sympathetic interpretation of impressions received by the writer during a stay of 5 months in America in 1916, when, as exchange professor of biology at Harvard, he visited many of the principal seats of learning in the United States."—*O. A. Stevens.*

1623. BERNARD, CH., J. J. B. DEUSS, ET AL. Bibliographisch overzicht III. [Bibliographical survey III.] *Dept. Landb. Nijv. en Handel [Nederland.-Indië] Proefsta. Thee Mededeel.* 72. 116 p. 1920.—Seventy-five Dutch reviews of literature of interest in connection with tea culture, which had previously appeared in *Teysmannia*, are classified under culture, diseases and enemies, preparation, and miscellaneous.—*Carl Hartley.*

1624. BISCHOFF, AD. Saatzuchtgenossenschaften. [Seed breeding associations.] *Jour. Landw.* 70: 81-100. 1922.

1625. BOWER, F. O. Obituary notice. *Trans. and Proc. Bot. Soc. Edinburgh* 27: 342-344. 1919.—A brief sketch and appreciation are given of Dr. Robert Chapman Davie (1887-1919).—*Roxana Stinchfield Ferris.*

1626. BROTHERSON, R. P. *The Manse Garden*. Gard. Chron. 71: 320-321. 1922.—Nathaniel Paterson, author of the Manse Garden, was either the grandson or great-grandson of Old Mortality (the subject of a book by Sir Walter Scott) whose real name was Robert Paterson. He was then a minister at Galashiels near Glasgow. The Manse Garden, published anonymously, was very popular, and was written to stimulate garden cultivation. Several quotations from the book on garden procedure are given and comments are made regarding the work.—*P. L. Ricker*.

1627. C[OHEN] S[TUART], C. P. *De legende van het ontstaan der theeplant*. [The legend of the origin of the tea plant.] De Thee 1: 83-85. 1 fig. 1920.—A Dutch translation is given of the Latin account by Engelbrecht Kaempfer (*Amoenitates exoticæ*, Lemgo, 1712) of the legend of the origin of the first two tea bushes from the amputated eyelids of an Indian ascetic. The supposed connection with eye lids was believed by the Jaapnese to explain the effect of tea in preventing sleepiness. This is explained as a case of the signature doctrine.—*Carl Hartley*.

1628. GAGER, C. STUART. *Historical note concerning the Brooklyn Hunt Botanical Garden*. Brooklyn Bot. Gard. Rec. 11: 118-121. 1922.—Quotations are given from the "Second annual address delivered before the Brooklyn Horticultural Society," by the president, John W. Degrauw, Esq., Dec. 6, 1855. The quotations give information (in addition to that given in Brooklyn Bot. Gard. Rec. for October, 1918) concerning the attempt to establish in Brooklyn "The Hunt Botanical Garden," and the complete failure of the plans.—*C. S. Gager*.

1629. GAGER, C. STUART. *The first "botanic" garden in Brooklyn*. Brooklyn Bot. Gard. Rec. 11: 115-118. 1922.—An account is given of the "Horticultural and Botanic Garden of Brooklyn," established in Brooklyn, New York in 1825 by André Parmentier, who came to Brooklyn from Belgium. André Parmentier was a relative of Anthony Parmentier, who is said to have introduced the potato into France. This early Brooklyn garden had an area of 25 acres and offered for sale the surprising number of 242 kinds of apples, 190 pears, 71 cherries, 64 peaches, 85 plums; also 396 varieties of ornamental trees and shrubs, including 200 varieties of roses. André Parmentier died Nov. 27, 1830.—*C. S. Gager*.

1630. GRIEVE, SYMINGTON. *Obituary notice*. Trans. and Proc. Bot. Soc. Edinburgh 27: 339-342. 1919.—This is a sketch and appreciation of Dr. William Watson (1832-1912), president of the Edinburgh Botanical Society from 1897 to 1899.—*Roxana Stinchfield Ferris*.

1631. HAVENHILL, L. D. *The cultivation of medicinal plants*. Trans. Kansas Acad. Sci. 30: 33-39. 1919/21 [1922].—This short historical account calls general attention to a few drugs, including ginseng, mint, hydrastis, camphor, belladonna, digitalis, and echinacea. A plea for the necessity both of cultivation and of interesting people in the subject is included.—*F. C. Gates*.

1632. HEITLAND, W. E. *Agricola, a study of agriculture and rustic life in the Greco-Roman world from the point of view of labour*. x + 492 p. University Press: Cambridge, 1921.

1633. HERTEL, H. *Lensgreve B. Wedell*. Tidsskr. Landokonomi 1922: 493-496. 1 pl. 1922.—This article records the death and life work of Count B. Wedell, one of Denmark's largest landholders and a leading figure in Danish agriculture.—*Albert A. Hansen*.

1634. JENSEN, JOHS. *Beretning fra Statskonsulent Johs. Jensen, Aabenraa*. [Report of state agent Johs. Jensen of Aabenraa.] Tidsskr. Landokonomi 1922: 418-423. 1923.—This report from the government agent stationed in the recovered province Slesvig (Schleswig), returned by Germany to Denmark after the World War, states that under German rule farming in Slesvig was inferior to farming in Denmark, due principally to the fact that the Danes in Slesvig were heavily taxed.—*Albert A. Hansen*.

1635. JEPSON, W. L. *Carex* exploration in California, an historical note. *Erythea* 8: 5-6. 1922.—The history of *Carex* collecting is traced from the date of the earlier expeditions until the present time, with indication of the special region covered by the various collectors.—W. L. Jepson.

1636. KRUIF, PAUL H. DE. Jacques Loeb, the mechanist. *Harper's Mag.* 146: 182-190. 1922.—The writer presents a resumé of Loeb's work and an analysis of his methods of thought.—C. W. Dodge.

1637. LYONS, H. G. Science in Egypt. *Nature* 110: 283-286. 1922.—The development of the various branches of science in Egypt is briefly reviewed.—O. A. Stevens.

1638. MENZIES, DAVID. Dr. Archibald Menzies. *Gard. Chron.* 72: 7. 1922.—Additions are presented to notes published in *Gard. Chron.* Dec. 24, 1921.—P. L. Ricker.

1639. MOORE, FREDERICK W. William Watson, V. M. H. An appreciation. *Gard. Chron.* 72: 30. 1922.—This article gives a brief biographical sketch on Watson's retirement as curator of Kew Gardens.—P. L. Ricker.

1640. ORR, JOHN. A short history of British agriculture. 96 p., illus. Oxford University Press: London. 1922.—This book devotes a chapter to the story of how men became farmers, considers the history of the art of growing grain, and gives briefly the agricultural history of Britain. The rise of the manor system under William the Conqueror, its decline, the establishment of the landlord-tenant system, and the beginning of modern farming are described. The influence of agricultural literature is traced, beginning with the writing of Walter of Henly in the 13th century. The author tells of the establishment of the first Board of Agriculture in 1793, its effect, and the initial step toward giving farmers a scientific education in a systematic way by the employment in 1803 of Sir Humphrey Davy to lecture on agricultural chemistry. The enactment of important agricultural legislation is described. [See also Bot. Absts. 12, Entry 1645.]-Mary R. Burr.

1641. PARKER, JOHN H. A review of literature on the rusts of oats, with notes on their distribution in the United States. *Trans. Kansas Acad. Sci.* 20: 71-118. 1919/21 [1922].—This is an extended review of 52 cited papers, published before 1916, dealing in part at least with the 2 rusts of oats, *Puccinia Lolii* Niels. f. sp. *Avenae* (crown or leaf rust of oats) and *Puccinia graminis* Pers. f. sp. *Avenae* Erikss. and Henn. (black stem rust), to which is added a series of extracts from answers to a questionnaire sent to each state agricultural experiment station and to each cereal field station of the U. S. Department of Agriculture in February, 1916.—F. C. Gates.

1642. PAYNE, C. HARMON. The history of the moss rose. A critique. *Gard. Chron.* 72: 49, 69-70, 84, 93, 108, 124, 135. 1922.—Comments are presented on a previous article by Major Hurst [see Bot. Absts. 11, Entry 267].—P. L. Ricker.

1643. RICHARDSON, A. E. V. The practical value of agricultural education. *Jour. Dept. Agric. Victoria* 18: 577-586. 1920.—This is an account of agricultural education, the experiment stations, and extension work in America with the applications that should be made for Victorian (Australia) conditions.—Wm. E. Lawrence.

1644. RIDDELL, WILLIAM. The pharmacopeia of another botanical physician. *Trans. and Proc. Bot. Soc. Edinburgh* 28: 1-23. 1920.—An abstract of *The Vegetable Family Physician* by Samuel B. Emmons (Boston, 1836), a follower of the Thomsonian School of Medicine, is given.—Roxana Stinchfield Ferris.

1645. RUSSELL, E. J. The history of British agriculture. [Rev. of: (1) ERNLE. *English farming: Past and present*. 3rd ed., xvi + 504 p. Longmans, Green and Co.: London, 1922.

(2) ORR, JOHN. A short history of British agriculture. 96 p. Oxford University Press: London, 1922 (see Bot. Absts. 12, Entry 1640).] Nature 110: 204-205. 1922.—This edition of the 1st book differs from the previous one in that it contains a chapter on the war farming of 1914-1918. The 2nd book will be very useful to teachers of agriculture.—O. A. Stevens.

1646. SCHRAMM, J. R. The abstracting and indexing of biological literature. Science 56: 495-501. 1922.

1647. SETCHELL, WILLIAM ALBERT. Aboriginal tobaccos. Amer. Anthropol. 23: 397-414. Pl. 3. 1921.—The author has grown seed of tobaccos still in use by various Indian tribes of North America and has studied the geographical distribution of the various species of *Nicotiana*: *N. Tabacum* L. occurring from Brazil to Mexico; *N. rustica* L. used east of the Mississippi River; *N. Bigelovii* (Torr.) Watson and its relatives used in California, Oregon, and North Dakota; *N. attenuata* from Arizona to British Columbia; and *N. trigonophylla* in the Southwest. The author concludes that the distributional evidence points toward an American home for the tobacco plant.—C. W. Dodge.

1648. TONI, G. B. DE. Francesco Baglietto. Nuova Notarisia 33: 32-43. 1922.—This is a biographical and bibliographical sketch of the well-known Italian lichenologist and mycologist and "the last pupil of the illustrious Prof. Giuseppe De Notaris." Baglietto was associated with De Notaris and Cesati in issuing the Erbario Crittogamico Italiano. He was born at Voltri in 1826 and died in Genoa Feb. 24, 1916.—Marshall A. Howe.

1649. WAKSMAN, SELMAN A. Enzymes of microorganisms. Absts. Bact. 6: 265-299, 331-360. 1922.—A bibliographic and historical review is represented with citations to 957 papers bearing on the subject.—D. Reddick.

1650. WALCOTT, C. D. The new building of the National Academy of Sciences, U. S. A. Nature 110: 120-122. 1 fig. 1922.

1651. WALKER, K. C. Bibliography and research. Science 56: 418. 1922.

1652. WIENER, LEO. Africa and the discovery of America. Vol. II. xxi + 287 p., 27 pl. Innes & Sons: Philadelphia, 1922.—References to the early literature regarding cotton are given, from the inscriptions of Sennacherib to Theophrastus. Philological evidence is presented that cotton originated in Assyria and India and that it was not introduced into Egypt or Europe until the Arabic conquest. The author regards the statements in Pliny, other than those copied from Theophrastus, as largely interpolations of a much later date. The author suggests that if the accounts of Columbus and the early explorers are correct, *Bombax ceiba* rather than *Gossypium* was the plant meant by "cotton." Since Columbus brought seeds of a number of plants on his 2nd voyage, it is probable that he imported cotton, a crop perhaps new to the Indians since they were so reluctant to cultivate it. Most of the native cloth was made from the maguey. Cotton culture in Mexico is discussed in detail with a survey of all available references in 16th century literature. In considering the antiquity of cotton in Peru, the author criticises severely the attempts to base chronology on guano deposits. He suggests that cotton was introduced at the Conquest by the negro overseers. Evidence is given that the presence of cotton in graves is no safe criterion of its antiquity.—In discussing the origin of tobacco, the author quotes widely to show the use of fumigations and smoking in ancient and mediaeval medicine. Smoking for pleasure and the "smoke vender" are discussed historically and philologically. There are presented many references to the cultivation of tobacco in Africa and America, and to its use by the natives, both as a medicine and in pursuit of pleasure. The introduction of *Nicotiana* to Europe and its spread are discussed in great detail. The botanical arguments are carefully presented as are also the archaeological data. The author concludes that tobacco was probably of African origin, and brought to America from the Mandingo country in the centuries immediately before the voyages of Columbus. [See also Bot. Absts. 11, Entry 1075].—C. W. Dodge.

1653. WIENER, LEO. *Africa and the discovery of America*. Vol. III. xxi + 402 p., 41 pl. Innes & Sons: Philadelphia, 1922.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 1622, 1632, 1637, 1640, 1643, 1645, 1978)

1654. ANONYMOUS. *The Royal Botanic Society's gardens*. Nature 110: 185-187. 1 fig. 1922.—This is a brief review of organization and work. The figure is an aerophoto of the grounds.—O. A. Stevens.

1655. ANONYMOUS. *Plant morphology and physiology*. [Rev. of: DIXON, H. H. *Practical plant biology: A course of elementary lectures on the general morphology and physiology of plants*. xi + 291 p. Longmans, Green and Co.: London, 1922.] Nature 110: 274-275. 1922.—This book comprises 30 lectures treating a wide range of plant types from unicellular forms to flowering plants. Outstanding features are the interest and charm of the author's style, and the wide use of data from physics and chemistry.—O. A. Stevens.

1656. ANONYMOUS. [Rev. of: SKENE, M. *Common plants*. (Common Things Series.) 271 p. 26 pl. Andrew Melrose: London, no date.] Nature 110: 177. 1922.—This book is said to be a very readable account of the various problems and achievements of plant study. [See also Bot. Absts. 11, Entry 1085.]—O. A. Stevens.

1657. BÜNGER. *Die Ausbildung des Landwirtschaftslehrers*. [The training of agricultural teachers.] Jour. Landw. 70: 101-108. 1922.

1658. CLUTE, WILLARD N. *Botany for beginners III*. Amer. Bot. 28: 102-106. 1922.

1659. CLUTE, WILLARD N. *Botany for beginners VI*. Amer. Bot. 28: 155-158. 1922.

1660. CLUTE, WILLARD N. *Plant names and their meanings-XII. Labiatae*. Amer. Bot. 28: 115-123. 1922.

1661. CLUTE, WILLARD N. *Plant names and their meanings-XIII. Labiatae-II*. Amer. Bot. 28: 145-153. 1922.

1662. DAVIS, W. H. *The teaching of plant pathology*. Proc. Iowa Acad. Sci. 27: 81-84. 1920.—Plant pathology is a comparatively new subject about which very little is known by the general public. The public schools should educate children along this line. The course should be concerned with little about many parasites rather than much about few. Definite objects or questions should be given the student in laboratory and definite summaries or conclusions should be required.—H. S. Conard.

1663. HUBER, W. A. *Die Staatsförsterschule in Ort bei Gmunden*. [The state forestry school at Ort near Gmunden.] Wien. Allg. Forst u. Jagd Zeitg. 40: 37-38. 1922.—An Austrian state boarding school of forestry, having a capacity of about 50 students, is now in operation near Gmunden. Sons of foresters only are accepted. The project was started in 1910 under the patronage of Emperor Franz Joseph. It was barely under way when interrupted by the war. It has now been revived with a membership of 38 students (125 applicants).—F. S. Baker.

1664. JAMES, J. A., and A. A. WIPPERMAN. *Science in Wisconsin high schools*. School and Soc. 16: 367-371. 1922.—This is an investigation of the changing status of the sciences in the high schools with particular reference to change in enrollment.—W. L. Eikenberry.

1665. PAGE, JOHN C. **Biology: its educational value socially considered.** *Education* 42: 585-604. 1922.

1666. SCHÖNWIESE. **Die Ausbildung der Staatsförster.** [The training of government foresters.] *Wien. Allg. Forst u. Jagd Zeitg.* 40: 56. 1922.—Comments are made on criticisms brought by the State Foresters Association defending the adequacy of the instruction at the new forest school at Ort near Gmunden.—*F. S. Baker.*

1667. SEEDORF, W. **Zur Frage des Hochschulunterrichts in der landwirtschaftlichen Betriebslehre.** [Concerning advanced instruction in agricultural teaching.] *Jour. Landw.* 70: 163-170. 1919.

1668. TAGG, HARRY F. **The preservation of artificial cultures of moulds.** *Trans. and Proc. Bot. Soc. Edinburgh* 27: 335-337. 1919.—Cultures of moulds killed by formalin vapor may be preserved for class use by (1) sealing the Petri dish in those cultures that do not liquefy the medium, and (2) melting the medium in water and floating the culture upon a glass plate which can later be sealed with a watch glass and cemented with a small amount of preserving fluid consisting of equal parts of formalin, glycerin, and water under the glass to insure a life-like appearance. The latter method is much better than drying the cultures upon cards.—*Roxana Stinchfield Ferris.*

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEO. D. FULLER, *Assistant Editor*

(See in this issue Entries 1547, 1560, 1597, 1697, 1699, 1721, 1846, 1878, 1889, 1933, 1940, 1941, 1946, 1949, 2005, 2124, 2211, 2218)

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 1545, 1663, 1666, 1843, 1880, 2050, 2053, 2077, 2132, 2133)

1669. ANONYMOUS. **Big tree contest.** *Brooklyn Bot. Gard. Rec.* 11: 124. 1922.—From 300 records received it was ascertained that probably the largest tree on Long Island is a sycamore (*Platanus occidentalis*) at Wheatley Hills, 24 feet in circumference; the next largest a white oak (*Quercus alba*), at Stony Brook, 19 feet, 17 inches in circumference; and the third largest a sycamore, at St. James, 18 feet, 4 inches.—*C. S. Gager.*

1670. ANONYMOUS. **Forest fires worst in six years.** *Amer. Forest.* 28: 540-541. 1922.

1671. ANONYMOUS. **Forest products laboratory, Madison Wisconsin.** U. S. Dept. Agric. Dept. Circ. 231. 47 p. 1922.—A brief account is given of its work and aims.—*L. R. Hesler.*

1672. ANONYMOUS. **Government forest work.** U. S. Dept. Agric. Dept. Circ. 211. 47 p. 1922.—This is a popular treatise on the beginning of government forest work, national forests, protection, cooperation with the states, research, publications, etc.—*L. R. Hesler.*

1673. ANONYMOUS. **Important forest trees of the eastern United States.** U. S. Dept. Agric. Dept. Circ. 223. 11 p. 1922.—This is a key to the common kinds of trees (reprinted from U. S. Dept. Agric. Bull. 863) and a table with remarks giving the names and range of 100 important eastern forest trees.—*L. R. Hesler.*

1674. ANONYMOUS. **Preserve the national parks.** *Canadian Field Nat.* 36: 51-52. 1922.—The public should be kept informed of apparently innocent commercial projects which may be used for the fullest exploitation of the natural resources of parks.—*W. H. Emig.*

1675. ANONYMOUS. Redogörelse för Verksamheten vid Statens Skogsförsöksanstalt under år 1920. [Annual report of the activities of the Swedish forest experiment station, 1920.] Meddel. Statens Skogsförsöksanst. 18: 329-340. 1921.—The activities of the various departments are discussed by their respective heads, as follows: Forest management, GUNNAR SCHOTTE, Director; natural science, HENRIK HESSELMAN; forest entomology, IVAR TRÄGÅRDH; natural reproduction in Norrland, EDVARD WIBECK. The report is followed by a similar one covering the year 1921.—G. A. Pearson.

1676. ANONYMOUS. Silvicultural notes. Indian Forest. 48: 401-404. 1922.—Natural regeneration of Haldy, *Adina cordifolia*, was secured only after heavy cutting and slash fires and did not follow any cutting without the aid of fire. A very brief annotated yield table for 4 sites of sal in the United Provinces is given, the site classes being based on average height of dominant trees.—E. N. Munns.

1677. ANONYMOUS. Tests with silver fir for use as sleepers. Indian Forest. 48: 316-327. 1922.—Wood tests of *Abies pindrow* with American Douglas fir (*Pseudotsuga taxifolia*) show that there is little difference in the strength or character of the woods. Durability tests have not yet been run.—E. N. Munns.

1678. ANONYMOUS. The national forests of New Mexico. U. S. Dept. Agric. Dept. Circ. 240. 21 p., 7 fig. 1922.

1679. ANONYMOUS. Trade names for Indian timber. Indian Forest. 48: 135-141. 1922.—A list of the accepted common names is given for 145 Indian timber species.—E. N. Munns.

1680. ANONYMOUS. Your national forests. Amer. Forest. 28: 276-277. 1922.—This editorial briefly summarizes the national forest resources of the U. S. A., their extent, value, yield in lumber, and relation to grazing, water power, and recreation.—Chas. H. Otis.

1681. ANONYMOUS. [Rev. of: GAMBLE, J. S. A manual of Indian timbers; an account of the growth, distribution, and uses of the trees and shrubs of India and Ceylon, with descriptions of their wood-structure. Reprint of 2nd ed. with some additions and corrections. xxvi + 868 p., 20 pl. Sampson Low, Marston and Co.: London, 1922.] Nature 110: 276. 1922.

1682. ANONYMOUS. [Rev. of: STONE, HERBERT. A guide to the identification of our more useful timbers: Being a manual for the use of students of forestry. viii + 52 p., 3 pl. University Press; Cambridge, 1920]. Nature 110: 276. 1922.—[See also Bot. Absts. 7, Entry 764; 11, Entry 10.]

1683. ANONYMOUS. [Rev. of: STONE, HERBERT. A text-book of wood. vii + 240 p., 41 pl. Rider and Son: London, 1921.] Nature 110: 73-74. 1922.—This book is intended for advanced students. It contains some good photographs of wood structures, but many errors of various kinds.—O. A. Stevens.

1684. ASHE, W. W. The creation of the eastern national forests. Amer. Forest. 28: 521-524. 3 fig., 1 map. 1922.

1685. BEESON, C. F. C. The beehole borer of teak: a preliminary report on the ecology and economic status of *Duomitus ceramicus* in Burma. Indian Forest Rec. 8²: 1-105. Pl. 1-6, diagr. 1-3. 1922.—The beehole borer causes severe losses in growth and in the stand. Vigorous trees apparently are more often attacked than the suppressed stand. The average number of holes per tree is directly proportional to the girth. This is due to the more successful development of the insect larvae with rich food supplies. Fire does not appear to be a controlling agent, but thinnings reduce the attack considerably.—E. N. Munns.

1686. BERGER, A. *Die Arbeitsteilung der Tayloristischforstlichen Arbeitsgemeinschaft.* [The "Taylor System" in forest industry.] Wien. Allg. Forst u. Jagd Zeitg. 40: 55-56. 1922.—The author discusses the principles of the system and urges forest owners to acquire greater familiarity with them.—*F. S. Baker.*

1687. BLANDFORD, H. R. *Teak as an even-aged crop.* Indian Forest. 48: 429-431. 1922.—Teak should be thinned early to a wide spacing as later it does not respond to changes in growth conditions. This should be reflected in wider spacing at the time of planting and underplanting with other species of commercial value, which as yet have not been tried. Bamboo as an understory does not produce sufficient revenue.—*E. N. Munns.*

1688. BORTHWICK. *Forest protection.* [Abstract.] Rept. British Assoc. Adv. Sci. 1921: 451. 1921.

1689. BRANDT. *Auffrieren von Nadelholzkulturen.* [Frost-heaving of planted conifer stock.] Deutsch. Forstzeitg. 37: 494-495. 1922.—Damage to uncovered plants was about 80 per cent; plants covered with needle-straw, moss, and rye chaff all escaped; with a covering of heather, pine, and oak twigs, the loss was about 5 per cent, and with coarse sand 10 per cent.—*W. N. Sparhawk.*

1690. BRODERICK, J. J. *England's forestry problem.* Amer. Forest. 28: 341-342. 1922.—In this speech by the commercial counsellor of the British Embassy on the occasion of the acceptance of a gift of Douglas fir seed to Great Britain, the forest policy of England is reviewed.—*Chas. H. Otis.*

1691. C., S. *"Geimpftes" Holz.* ["Inoculated" wood.] Deutsch. Forstzeitg. 37: 464-465. 1922.—Reimann has patented a method for coloring common woods to resemble various cabinet woods and to imitate their grain.—*W. N. Sparhawk.*

1692. CHAMPION, F. W. *"La methode du contrôle" for selection forests.* Indian Forest. 48: 349-364. 4 graphs. 1922.—The method of control, a management plan, was put into limited practice in Switzerland to produce the greatest value in small quantities of material of highest value. The basis is a study of the diameter growth during the entire life of the stand as an indication of its growth and health. Theoretically the method is an ideal form of management, but it is impossible in practice on any but very small areas and then only by well trained foresters.—*E. N. Munns.*

1693. CHAMPION, F. W. *The femelschlag system or the system "by coupes jardinatoires."* Indian Forest. 48: 115-127. 5 fig. 1922.—This system is used in mixed forests of beech, spruce, and fir where the age classes are unevenly distributed and where there is no definite felling cycle. In effect is a thinning rather than a cutting, releasing reproduction and advance growth whenever necessary, and securing high quality wood. The chance of failure in securing reproduction is minimized, the method is elastic, and is adapted to tolerant trees.—*E. N. Munns.*

1694. CHAMPION, H. G. *Note on the death of chir (Pinus longifolia) poles in the Almora plantations of Kumaon.* Indian Forest. 48: 168-173, 232-246. Pl. 9. 1922.—Extensive dying off of chir in plantations has made it imperative to combat this death rate. The high mortality nullifies attempts to complete stocking of poorer areas, for in 3 years' time 25 per cent of the dominant trees were killed. Control measures recommended are the removal of suspected trees and the burning of all resulting debris.—*E. N. Munns.*

1695. CHAPMAN, H. H. *Forest mensuration.* xii + 553 p. John Wiley and Sons: New York; Chapman and Hall, Ltd.: London, 1921.—This text book is a successor to Graves' Forest Mensuration. It discusses the measurement of the volume of felled timber; the meas-

urement of standing timber; and the growth of trees, forest stands, and forests. Part 1 shows the relation of the cubic contents of logs and other measurement to the contents as expressed in terms of products. Part 2 presents a complete analysis of the art of timber estimating as practiced in every timber region of the U. S. A. Part 3 aims to systematize the principles and problems that are encountered in studying tree growth. The book contains 89 tables. A 10 page appendix on lumber grades and rules follows the text and a 13-page appendix on the measurement of piece products outlines practical suggestions.—[See also Bot. Absts. 12, Entry 398.]-T. C. Harbeson.

1696. CHEYNEY, E. G. *The passing of an industry. An epic of the great American forest.* Amer. Forest. 28: 323-338. 24 fig., 1 map. 1922.—A popular résumé is presented of timber resources and logging industries in the U. S. A. and their historical background from the time of the landing of the Pilgrims to the present day.—Chas. H. Otis.

1697. COOPER, H. L. *Notes on some Assam rain forests.* Indian Forest. 48: 131-132. 1922.—The rapid rate of decay and the weight of the climbers aiding in breakage and wind-falls are thought to be the reasons why trees in rain forests do not attain great size.—E. N. Munns.

1698. CRIDDLE, NORMAN. *The relation of wild life to agriculture.* Canadian Field Nat. 36: 47-49. 1922.—With the advent of civilization, followed by cultivation, the natural balance became changed. A restoration of the former balance might be accomplished by the establishment of wild life sanctuaries and the planting of trees and berry-bearing shrubs near farm buildings.—W. H. Emig.

1699. CUNLIFFE, N. *Height growth of trees.* Quart. Jour. Forest. 16: 274-275. 1922.—Vigorous young trees averaging $2\frac{1}{2}$ m. were measured every 2 weeks for height growth during the summer of 1921 to determine effect of climatic factors. Corsican pine and western yellow pine (*Pinus ponderosa*) grew most rapidly at the end of May; Sitka spruce, Douglas fir, and lowland white fir (*Abies grandis*) in the latter part of June. Growth of all these species started the end of April and ceased in July or early August. In European and Japanese larch the whole growth period was 2-4 weeks later than in the other conifers, and growth was more regularly distributed over the whole period. Beech differed markedly from the conifers in that it grew very rapidly during May and only slowly during June and the early part of July. The maximum daily increment of the most vigorous trees, varied from 4.7 mm. for western red cedar (*Thuja plicata*) to 33.5 mm. for beech. The former showed a slight winter growth and also a small growth of the previous year's shoots. In Corsican pine and Sitka spruce temperature was more important than all other factors combined in determining fluctuations in growth rate. The same was true for larch when the mean shade temperature did not rise about 66°F., above 66 growth was depressed. An increase in mean air temperature during the entire growing period decreases the annual growth of Corsican pine while a rise in the mean daily temperature increases the daily increment. Annual increment proved inversely related to mean soil temperature at the 6-inch depth for May and June. Rainfall of the growing period appeared more important than that of the previous winter.—C. R. Tillotson.

1700. DINGLER, MAX. [Rev. of: STELLWAAG, F. *Die Schmarotzerwespen (Schlupfwespen) als Parasiten.* (The parasitic wasps.) Beih. Zeitschr. Angew. Entomol. No. 6. 1921.] Forstwiss. Centralbl. 44: 32-34. 1922.—This is the first comprehensive biological treatise on a group of insects very important in agriculture and forestry. The author includes in the group all those insects—8 families and certain species of 2 others—which show true parasitism.—W. N. Sparhawk.

1701. EBERHARD, J. *Der Schirmkeilschlag und die Langenbrander Wirtschaft.* [The shelterwood-wedge cutting and the Langenbrand method.] Forstwiss. Centralbl. 44: 41-54, 103-109, 137-150. 5 fig. 1922.—The author discusses his system of silviculture and replies to

criticisms by C. Wagner. The essentials of the method are: (1) light cuttings over the whole area to secure reproduction of tolerant species, followed at frequent intervals by other light cuttings to keep the young growth in good condition; (2) gradual removal of mature timber by wedge-shaped cuttings, which are enlarged a little each year until the whole area is covered. The article is accompanied by a bibliography of 30 titles.—*W. N. Sparhawk.*

1702. ECKSTEIN. *Der Buchenspringrüsselkäfer Orchestes fagi* und seine wirtschaftliche Bedeutung. [The beech weevil, *Orchestes fagi*, and its economic significance.] Deutsch. Forstzeitg. 37: 435-437. 1922.—The life history and habits of this leaf-eating beetle are discussed. Although attacking only beech in the forest, outside the forest it eats several cultivated trees and crops. The leaves, punctured along the midrib for the deposition of eggs, exude a "leaf honey", sought by bees.—*W. N. Sparhawk.*

1703. ESCHERICH, K. [Rev. of: DECOPPET, M. *Le haneton. Biologie, apparition, destruction.* (The May beetle.) 130 p., 5 charts, 42 maps. Lausanne and Geneva, 1920.] Forstwiss. Centralbl. 44: 74-76. 1922.—Decoppet's monograph contains much valuable information about the May beetle in Switzerland, especially regarding control methods. He believes that the differences in period of development of the beetle in different localities are due to hereditary characteristics rather than to climatic factors. This theory is directly opposed to the views of others, especially Zweigelt.—*W. N. Sparhawk.*

1704. EYSEL, JOH. *Der erste österreichische Almwirtschaftstag und der Weidwald.* [Alpine agriculture and grazing forests.] Wien. Allg. Forst u. Jagd Zeitg. 40: 61-62. 1922.—Present economic conditions make alpine grazing an important business. It is leading to the destruction of high altitude forests. The importance of maintaining a forest cover is recognized. Legal difficulties are in the way of a proper combined grazing and forest management. Present law recognizes only grazing lands (alpine meadows) and timberlands, and not a combination.—*F. S. Baker.*

1705. FABRICIUS, L. *Holzartenzüchtung.* [Breeding of forest trees.] Forstwiss. Centralbl. 44: 86-103. 1922.—Some attention is now given to the selection of seed adapted to sites where it is to be grown. The principles and methods of plant-breeding are briefly outlined, and the possibility of applying the same methods to developing new strains of tree species is discussed. The author regards this as a promising field for research.—*W. N. Sparhawk.*

1706. FABRICIUS. [Rev. of: ANDÉS, LOUIS EDGAR. *Die technischen Vollendungsarbeiten der Holz-Industrie.* (The technique of finishing wood.) 6th ed., 253 p., 54 fig. Vienna and Leipzig, 1920.] Forstwiss. Centralbl. 44: 38-39. 1922.—This book full of helpful suggestions on how to polish, color, and otherwise finish woods for use in furniture and decorative work, is extremely important to German wood-working industries.—*W. N. Sparhawk.*

1707. FABRICIUS. [Rev. of: GAYER, SIG. *Die Holzarten und ihre Verwendung in der Technik.* (Kinds of wood and their utilization.) 2nd ed., 278 p., 47 fig. Leipzig, 1921.] Forstwiss. Centralbl. 44: 39. 1922.—This book, written especially for the wood-working industries, covers the structure and identification of wood, chemical composition of wood and bark, technical properties and defects, uses of individual species, and utilization of by-products and wood-waste.—*W. N. Sparhawk.*

1708. FABRICIUS. [Rev. of: THENIUS, GEORG. *Das Holz und seine Destillations-Produkte.* (Wood and products of its distillation.) 3rd ed., 493 p. Vienna and Leipzig, 1921.] Forstwiss. Centralbl. 44: 37-38. 1922.—The book is regarded as an up-to-date work on dry distillation of wood.—*W. N. Sparhawk.*

1709. FEUCHTINGER. *Holzfüllung und Rodung mit mechanischen Vorrichtungen oder mittelst Springstoffen (Kultursprengungen)*. [Felling and clearing with mechanical apparatus or explosives.] Wien. Allg. Forst u. Jagd Zeitg. 40: 157-159, 169-171, 175-177, 183. 1922.

1710. GLASSON, A. K. *Regeneration of sal in the low level forests of the Duars*. Indian Forest Rec. 8⁴: 1-17. Pl. 1. 1922.—Old methods of regeneration failed to produce successful establishment of sal. By permitting agricultural use of the land and the care and cultivation of the young sal trees in rows or mounds, successful plantations have been established. Two agricultural crops can be raised before the sal interferes.—*E. N. Munns*.

1711. GROSS, J. *Zur Weidezucht*. [Basket-willow growing.] Möllers Deutsch. Gärtnerzeitg. 37: 209. 1922.—Willow twigs are in demand for the basket industry. From 1914 to 1918 many plantations were ruined by an excessive demand for baskets for large ammunition. The planting of cuttings of 25 cm. length of *Salix dasyclades*, *S. americana*, and *S. viminalis regalis* is recommended. The soil should be loosened to a depth of 50-60 cm. and the rows planted 50 cm. apart.—*J. C. Th. Uphof*.

1712. GUTHRIE, J. D. *Alaska's interior forests*. Amer. Forest. 28: 451-455. 7 fig. 1922.—The forests of interior Alaska are practically confined to the great basins of the Yukon and Kuskokwim rivers. Their area is estimated at 80-150 million acres. The principal trees are white spruce, white birch, balsam poplar, black cottonwood, aspen, black spruce, and tamarack or larch. Of these white spruce is by far the most important. Even with the most careful handling these forests will probably not fully supply the future needs of the country, although the rate of growth is fairly rapid. The species composing the interior forests are admirably suited for pulp. The chief uses of lumber have been for flume and sluice boxes, boat building, and houses and buildings. Considerable loss has occurred through forest fires. Seven items are considered by the writer as a part of any plan for forest protection in interior Alaska.—*Chas. H. Otis*.

1713. HAWLEY, R. C. *The practice of silviculture: with particular reference to its application in the United States*. xi + 352 p. John Wiley and Sons, Inc.: New York; Chapman and Hall, Ltd.: London, 1921.—This book treats of silvicultural practices applicable to forest conditions in America. It considers the establishment and development of forest stands, intermediate slash disposal cuttings, and the protection of stands against such destructive agents as fire, insects, fungi, animals, and wind. At the end of each of the 20 chapters appears a list of references, a total of 311. An appendix gives a full list of silvicultural terms and definitions, as compiled by a committee of the Society of American Foresters.—*Henry B. Phillips*.

1714. HOFINGER, ALOIS. *Der Taylorismus in der Forstwirtschaft—die Förderung des Tages*. [The "Taylor System" in forestry.] Wien. Allg. Forst u. Jagd. Zeitg. 40: 73. 1922.—This is an appeal for the application of the "Taylor System" (time studies of fundamental motions) in lumbering and forestry.—*F. S. Baker*.

1715. HOLSTE, GEORG. *Fichtenzapfen- und Fichtensamenbewohner*. [Insects infesting spruce cones and seed.] Forstwiss. Centralbl. 44: 69-74. 6 fig. 1922.—This is a summary of the results in investigations by Holste, Seitner, and Trägårdh. Of 44 species identified by the author in spruce cones from upper Bavaria, 3 are injurious to seed, 13 to cones, 15 are parasites of these injurious insects, 3 feed on molds and 3 on insects, 3 are mites, 2 are bugs occupying the cones as winter quarters, and the others are accidental. Several of the more important species are described.—*W. N. Sparhawk*.

1716. HUTCHINSON, W. *The eyes of the forest*. Amer. Forest. 28: 461-468. 15 fig. 1922.—This article describes the evolution of the fire lookout as developed by the U. S. Forest Service.—*Chas. H. Otis*.

1717. ILLICK, J. S. *The beeches*. Amer. Forest. 28: 546-551. 7 fig. 1922.

1718. ILLICK, J. S. The birches. Amer. Forest. 28: 355-364. 18 fig., 1 map. 1922.—This is a popular description of the common birches, their habits, characteristics, and uses.—*Chas. H. Otis*.

1719. ILLICK, J. S. The white oaks. Amer. Forest. 28: 586-592. 13 fig. 1922.—This is a popular consideration of the common white oaks,—*Quercus alba*, *Q. bicolor*, *Q. macrocarpa*, *Q. minor*, *Q. Prinus*, *Q. Muhlenbergii*, *Q. lobata*, and *Q. Garriana*.—*Chas. H. Otis*.

1720. KEARNEY, T. H. Tropical forests and their resources in French colonies. [Rev. of: BERTIN, A. Mission d'études forestières envoyée dans les colonies françaises par les ministères de la guerre, de l'armement et des colonies. Vol. I-V. Maps, diagr., illus. Émil Larose; Paris, 1918-1920.] Geog. Rev. 12: 512-513. 1922.

1721. LARSEN, J. A., and C. C. DELAVEN. Climate and forest fires in Montana and Northern Idaho, 1909 to 1919. Monthly Weather Rev. 50: 55-68. 13 fig. 1922.—The region was divided into 7 broad climatic and topographic sections for comparison. The area burned over varies greatly for the various sections, the average ranging from 234 acres in northern Idaho to 100 acres in eastern Montana. The greater hazard is due to differences in climatic conditions, especially rainfall, on the east and west slope of the Continental Divide. The heavy precipitation in Idaho results in a heavy forest, which in the dry period is subject to heavy losses. The most dangerous weather for forest fires occurs at the time of a succession of high pressure areas over the Pacific Northwest. Forest-fire predictions are as yet unreliable, reliance now being placed upon records of current climatic and fire conditions.—*E. N. Munns*.

1722. LORENZ, HEINRICH. Zollsätze auf die Holzeinfuhr nach Oesterreich für den neuen Zolltarif. [Import duties on wood under the new Austrian tariff.] Wien. Allg. Forst u. Jagd. Zeitg. 40: 127-128. 1922.

1723. MCCALLIE, S. W. Deforestation and erosion. Amer. Forest. 28: 394-396. 3 fig. 1922.

1724. NAGLE, W. Note on shingles made of "Kail" and "Chir" Indian Forest. 48: 328-330. 1 pl. 1922.

1725. NICHOLSON, J. W. Distribution and habit of *Dendrocalamus strictus* and *Bambusa arundinacea* in Orissa. Indian Forest. 48: 425-428. 1922.—The former appears to be confined to a belt with low average humidity in regions where the breezes from the Bay of Bengal are not felt. With increasing humidity, it gradually disappears. Within its range the nature of the soil is the governing factor, the species apparently preferring the physiologically dry soils. Flowering is rather irregular and sporadic, and apparently the tree has been forced from the good to poor soils and sites. *Bambusa arundinacea* prefers the moister sites and better soils, decreasing in importance as drier regions are reached.—*E. N. Munns*.

1726. NIKODEM. Waldbauliche Betrachtungen. [Forest planting observations.] Wien. Allg. Forst. u. Jagd. Zeitg. 40: 123-124. 1922.—The drought of 1921 caused many plantation failures. Success in dry seasons is best attained by planting carefully in large holes. On slopes the trees should be planted with the short roots toward the hill, and the soil around the tree should be left with an inward tilt to catch and hold water.—*F. S. Baker*.

1727. PACK, A. N. Fighting avalanches in the Pyrenees. Amer. Forest. 28: 259-262. 8 fig. 1922.—This is a popular description of afforestation methods, as practised by the French and Swiss governments, for the prevention of damage from avalanches and floods.—*Chas. H. Otis*.

1728. PEARSON, R. S. Results of antiseptic treatment of sleepers. Indian Forest Rec. 91: 1-49. 6 pl., 1 fig. 1922.—After 10 years' testing, the choice of treatment of railroad ties

lies between the Full Cell process using either creosote only or creosote and earth oil together, and Powellizing. The choice between methods is largely one of cost. Further experiments with the Open Cell and Card processes are advocated because of indications. So far, 2 species of *Terminalias*, 3 of *Dipterocarpus*, and 2 of *Pinus* have proved satisfactory. Other woods are being tested.—*E. N. Munns*.

1729. PETERS, J. C. Forest fire protection in Georgia. *Amer. Forest.* 28: 456-459. 5 fig. 1922.—From 1916 to 1921, inclusive, there were reported to the Forest Service 23,000 forest fires, of which 92 per cent resulted from carelessness or from design, and 8 per cent from lightning; 26 per cent were of incendiary origin, 21 per cent from causes unknown, 16 per cent from brush burning, and the remainder were caused chiefly by campers, lumbering, and railroads. About 6,000,000 acres were burned over, causing a money loss to timber and improvements alone of \$5,500,000. Cooperation of federal government and state is suggested for effective fire protection.—*Chas. H. Otis*.

1730. PETRINI, SVEN. Méthode du contrôle. [Method of control.] *Skogsvårdsför. Tidskr.* 19: 249-264. Fig. 1-4. 1921.—The article describes in considerable detail the management of a selection forest in France.—*G. A. Pearson*.

1731. PETRINI, SVEN. Stamformsundersökningar. [Investigations of stem form.] *Meddel. Statens Skogsförsöksanst.* 18: 165-220. Fig. 1-12. 1921.—In this discussion of the form class method of timber estimating the author analyzes the different factors influencing the accuracy of this method and bases his deduction on the results of investigations in stands of Lappland pine. Inaccuracy is apt to result by not getting the correct bark thickness. An ingenious instrument for securing accurate bark measurements is described and illustrated. The graphic methods of determining the average bark thicknesses, form points and form classes are also described and illustrated. Precautions to be taken in the application of this method are pointed out. An English summary is appended.—*Hermann Krauch*.

1732. PEYTON, J. S. State forestry laws of 1921. *U. S. Dept. Agric. Dept. Circ.* 239. 28 p. 1922.

1733. RECKNAGEL, A. B. The future of the American lumber supply. *Amer. Forest.* 28: 611-612. 1922.

1734. RECORD, S. J. Novel trees and forest products. *Amer. Forest.* 28: 481-484. 7 fig. 1922.—The article is popularly descriptive of the royal palm, oyster wood (*Excoecaria lucida*), kiri-gami (*Paulownia*), tree ferns and a peculiar use for them, crotch mahogany, and ash-splint pack baskets.—*Chas. H. Otis*.

1735. RHODES, G. H. Forestry as a business. *Amer. Forest.* 28: 515-520. 5 fig. 1922.—This article discusses the business methods of forest production, taxation, interest charges, etc.—*Chas. H. Otis*.

1736. RICHARDS, E. C. M. West Persia—the wood-famine country. *Amer. Forest.* 28: 579-585. 16 fig. 1922.

1737. RUBNER. Neuere Naturverjüngungsverfahren. [Recent methods of securing natural reproduction.] *Forstwiss. Centralbl.* 44: 1-23. 1922.—Silvicultural methods practised in several mixed forests of spruce, fir, and beech are described. While differing in detail, all emphasize preliminary cutting to secure reproduction and avoidance of conditions which permit sod or dense weeds to occupy the ground and hinder reproduction. Some form of shelterwood cutting over the whole area secures reproduction of the tolerant beech and fir, while strip or border cuttings, normally working from the north or northeast edges, are used to secure the spruce.—*W. N. Sparhawk*.

1738. RUSSELL, P. T. **General notes on nurseries and planting forest trees in the Cinchona plantations.** Mungpoo, Darjeeling District. *Indian Forest*. 48: 224-231. 1 fig. 1922.—Twenty-seven species of native trees have been planted in the past 10 years, and an area of 2,838 acres thus covered. Observations on the care of the trees in nursery and plantations, and methods used, are given.—*E. N. Munns*.

1739. RUSSELL, P. T., L. E. S. TEAGUE, and E. O. SHEBBEARE. **General notes on nurseries and planting in Bengal.** *Indian Forest Rec.* 84: 19-33. Pl. 8-11. 1922.—This summarizes the qualifications of a nursery, nursery practice, and plantings, with notes on 41 Indian species on which some work has been carried out in the nurseries.—*E. N. Munns*.

1740. S. **Die Waldungen von Jugoslawien.** [Forests of Yugoslavia.] *Deutsch. Forstzeitg.* 37: 425. 1922.—Yugoslavia has 7,500,000 hectares of forest, of which 3,162,700 are state forest. Large forest areas remain undeveloped and lack systematic exploitation. Present production is 22,500,000 cubic feet a year, of which 7,000,000 is conifer timber.—*W. N. Sparhawk*.

1741. S., H. W. **Teak regeneration.** *Indian Forest*. 48: 399-401. 1922.—Few teak seedlings result from sowing in the heavy teak cuttings, planted stock being finally used. Burning and the packing of the soil rather than infertile seed are held responsible for the failure. Instead of planting bare spots, it is suggested that better results might come from dibbling in furrows made during the late spring.—*E. N. Munns*.

1742. SCH. **Die Wälder Polens und Rumäniens.** [Forests of Poland and Rumania.] *Deutsch. Forstzeitg.* 37: 403-404. 1922.—The forest areas of the new Rumania and of the new Poland are given by districts and according to the kind of ownership. For Rumania they are classified as to kind of forest,—conifers, oak, beech, and other hardwoods. As a result of the war Rumania tripled her forest area, which is now 7,308,688 hectares. Poland has 9,770,000 hectares of forest, with an annual growth of 14,000,000 cubic m. of saw-timber and 18,000,000 of firewood, and can export about 6,000,000 cubic m. of logs, or 2-3 million cubic feet of sawed timber.—*W. N. Sparhawk*.

1743. SCHMID, F. **Die Bedeutung des Waldes für den Wasserabfluss und sein Einfluss auf die Geschiebeführung der Wildbäche.** [The significance of the forest in run-off and erosion.] *Wien. Allg. Forst u. Jagd. Zeitg.* 40: 146-147, 152-153. 1922.—This is a popular presentation of the work and results of Engler [see Bot. Absts. 9, Entry 710].—*F. S. Baker*.

1744. SECREST, EDMUND. **Forest planting.** *Ohio Agric. Exp. Sta. Monthly Bull.* 7: 144-151. 1922.—The author discusses salient features of forest planting under the following heads: planting stock, planting site, season for planting, spacing distance, methods of planting, direct seeding, care of planting stock, and care of trees after planting.—*R. C. Thomas*.

1745. SHEBBEARE, E. O. **The taungya system in Northern Bengal.** *Indian Forest Rec.* 84: 8-18. Pl. 2-18. 1922.—The employment of field crops to establish the forest crops is known as taungya. Usually a portion of the forest is clear felled in cold weather, the usable material removed, and the debris burned. Then the villagers sow their crops, among which the forest plants are grown in continuous lines or in planting holes spaced about 6 feet apart. From 2 to 3 agricultural crops are secured, depending on the elevation, species, and location. From 1 to 3 acres of this land supports a household.—*E. N. Munns*.

1746. SOMERVILLE, W. **Buds.** *Quart. Jour. Forest.* 16: 121-127. 1922.—The author discusses physiological characteristics of tree buds.—*C. R. Tillotson*.

1747. SONDEREGGER, V. H. **Boys' reforestation clubs.** *Amer. Forest.* 28: 496-499. 4 fig. 1922.

1748. SPESSIVTSEFF, PAUL. Bidrag till Kännedomen om Splintborrarnas Näringsgnag. [Contributions to the knowledge regarding food habits of the European splint beetles (*Eccoptogaster*).] Meddel. Statens Skogsförsöksanst. 18: 315-326. Fig. 1-5. 1921.

1749. SUDWORTH, GEO. B. A new chinquapin. Amer. Forest. 28: 300-301. 1 fig. 1922.—This is a description of *Castanea pumila Ashei* nov. var. a variety of the common chinquapin occurring in the coastal plain of southeastern U. S. A.—*Chas. H. Otis*.

1750. SUTHERLAND, J. Forestry in national and economic aspects. [Abstract.] Rept. British Assoc. Adv. Sci. 1921: 451. 1921.—[See Bot. Absts. 12, Entry 385.]

1751. SYLVÉN, HELGE. Den Skogsteknologiska Forskningen-Erfarenheter och rön från en studieresa i Amerika. [Research in wood technology—notes from a study tour in America.] Skogsvårdsför. Tidskr. 19: 220-246. Fig. 1-9. 1921.—The author has spent 4 years in North America, studying primarily methods of lumbering and utilization. The last year was devoted to a study of technical characteristics and uses of woods. This article outlines the work and organization of the Forest Products Laboratory at Madison, Wisconsin.—*G. A. Pearson*.

1752. THOMAS, C. H. Trees to take the place of those destroyed by chestnut blight. Amer. Forest. 28: 500-501. 1922.—This article mentions chestnut oak, pitch pine, black locust, and other trees which are replacing the chestnut killed by blight.—*Chas. H. Otis*.

1753. TRÄGÅRDH, IVAR. Skogsinsekternas Skadegörelse under 1918. [Damage by forest insects in 1918.] Meddel. Statens Skogsförsöksanst. 18: 282-314. Fig. 1-15. 1921.—The article, accompanied by a German summary, discusses the activities of various insects in Swedish forests.—*G. A. Pearson*.

1754. TROWSCOED. Artificial reproduction. Indian Forest. 48: 287-298, 365-375. 1922.—Observations during the work with the Himalayan conifers result in the conclusions that natural regeneration is always superior to artificial work, that artificial sowing and planting are essential to the complete and rapid stocking of an area, and that reproduction should be secured in the shortest possible time after cutting. General considerations regarding nursery, planting practice, and the subsequent care of plantations are outlined.—*E. N. Munns*.

1755. U. Die Zukunft der Jugoslawischen Wälder. [The future of Yugoslavian forests.] Wien. Allg. Forst u. Jagd Zeitg. 40: 141-142. 1922.—The author covers legal rather than silvicultural aspects and criticizes certain governmental forest regulations and present systems of taxation as fostering short sighted policies.—*F. S. Baker*.

1756. WATERSTON, JAMES. On Chalcidoidea; mainly bred at Dehra Dun, U. P., from pests of sal, toon, chir and sundri. Indian Forest Rec. 9²: 1-44. 19 fig. 1922.

1757. WESSLÉN, GÖSTA. Om Träkolsutbytet i Volym vid Milkolning. [Volume yield of charcoal in charcoal burning.] Skogsvårdsför. Tidskr. 19: 206-219. Fig. 1. 1921.—The article deals merely with the volume of product, without going into the technical aspects of the business.—*G. A. Pearson*.

1758. WICKENDEN, H. R. A sketch of Swedish forestry from an American standpoint. Indian Forest. 48: 468-478. 1922.—[See also Bot. Absts. 8, Entry 1048.]

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 1543, 1544, 1575, 1578, 1601, 1609, 1610, 1624, 1705, 1873, 1906, 1911, 1912, 1939, 2018, 2066, 2125, 2126, 2149, 2150, 2172, 2174, 2224)

1759. ANONYMOUS. Method employed by the state domains for producing and maintaining their high standard of Sakel cotton. Min. Agric. Egypt [Unnumbered Circ.] 3 p. 1922.—Methods are described of roguing fields at beginning of flowering period and of gathering seed for increase only from typical plants; this, it is claimed, has resulted in great improvement of quality and uniformity of crop.—*T. H. Kearney*.

1760. ANONYMOUS. [German rev. of: KAHN, EUGEN. Über die Bedeutung der Erbkonstitution für die Entstehung, den Aufbau und die Systematik der Erscheinungsformen des Irreseins. (On the significance of the hereditary constitution in the origin, growth and classification of the symptomatic forms of insanity.) Zeitschr. Gesamte Neurol. u. Psychiatrie 74: 69-102. 1922.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 219-220. 1922.

1761. ÅKERMAN, Å. Untersuchungen über eine in direktem Sonnenlichte nicht lebensfähige Sippe von *Avena sativa*. [Investigation on a form of *Avena sativa* unable to live in direct sunlight.] Hereditas 3: 147-177. 1922.—In the F₂ of hybrids between Danish Novahavre (Probsteier type oats) and black oats of middle Sweden, seedlings appeared in 1920 which, though normal green at first, yellowed and died in a short time when grown in the bright light of the field. In subdued light ($\frac{1}{4}$ - $\frac{1}{2}$ sunlight) defective plants retain green color and mature seed. This form called *lutescens*, segregated in F₂ in the ratio of about 1 yellow to 70 green; parents and F₁ were all green. Analyses of F₂ and F₃ indicate 63:1 ratio, due to 3 independent homomeric (i.e., duplicate) factors, all recessive to normal green. Novahavre is assumed as unifactorial for chlorophyll and black oats of middle Sweden as bi-factorial.—*C. E. Leighty*.

1762. ALEXANDER, JEROME. The physico-chemical mechanism of mutation and evolution. Science 56: 323-326. 1922.—Solutions of salts and colloids produce remarkable "flowering plants" upon drying. "Auto-protection" due to iso-colloidism is considered. Every substance passes through a colloidal zone before reaching a visibly crystalline state. This colloidal zone interferes with normal crystallization producing feathery forms. It is more surprising that plants and animals should breed true than that they should vary since bio-colloids are so readily affected by salts, H-ion concentration, temperature, actinic and traumatic effects. Specificity of germ plasma is evidently guarded by many factors such as selective adsorption and differential diffusion. Unusual influences must nevertheless occasionally have effect but only beneficial variations survive in nature. Complications due to enzymes, hormones, etc., in higher forms are considered. Simple forms are perhaps best for experiment, but even here are complications for even filterable viruses breed true.—*P. W. Whiting*.

1763. ALVERDES, F. [German rev. of: SIEMENS, H. W. Einführung in die allgemeine Konstitutions- und Vererbungspathologie. (Introduction to the study of general constitutional and hereditary disease.) 229 p., 80 fig. Julius Springer: Berlin, 1921] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 96. 1922.

1764. BABCOCK, E. B., AND J. L. COLLINS. A case of duplicate genes in *Crepis capillaris* (L.) Wallr. Science 56: 392. 1922.—Results are reported of crossing strains which had more or less pubescence on lower surface of midrib of rosette leaves with one which lacks it. F₁ plants were pubescent and F₂ conformed to ratio, 15 pubescent: 1 non-pubescent. In another cross both 15:1 and 3:1 F₂ populations were secured.—*R. E. Clausen*.

1765. BABCOCK, E. B., AND J. L. COLLINS. Inheritance of glandular pubescence in *Crepis capillaris* (L.) Wallr. Science 56: 392. 1922.—"Bald," which lacks normal glandular pubes-

cence on involucre bracts and pedicels, has been obtained from 6 widely separated geographical locations. Bald condition in these strains was shown to be identical by crossing, and it is a simple recessive to the normal condition.—*R. E. Clausen.*

1766. BAMBER, RUTH C. (MRS. BISBEE.) **The male tortoiseshell cat.** *Jour. Genetics* 12:209-216. 1922.—The author discusses theories of various authors to explain the male tortoiseshell cat. Doncaster's theory that it is a freemartin with complete sex-reversal except for sterility has been tested by examination of 70 pregnant females with a total of 253 kittens. No evidence of confluence of blood vessels was found. Two of the known tortoiseshell males came from matings of tortoiseshell female by yellow male and all sibs in both cases were said to be tortoiseshell and were therefore female. Hence the freemartin theory would be discredited. The possibility is suggested that tortoiseshell male might be due to reversal of "predestined" sex by influences such as those operative in Riddle's pigeons or Goldschmidt's or Harrison's moths; unisexual broods might then be expected. One known tortoiseshell male was produced by black female crossed with yellow male. This female had previously produced only male kittens by different sires. But this mating produced, besides tortoiseshell male, 1 tortoiseshell female and 1 black of unknown sex. Dissection was made of Doncaster's sterile male tortoiseshell, which was found to be typically male. Microscopic examination of left testis showed it to be similar to right, which had been previously reported [*Jour. Genetics* 1915], having large amount of interstitial tissue, well-developed seminiferous tubules, but no spermatozoa. Possibility of breaking down of sex-linkage, which may also account for unexpected black females, is discussed.—*P. W. Whiting.*

1767. BATESON, W. **Evolutionary faith and modern doubts.** *Nature* 109:553-556. 1922.—Variations are usually distinguishable as positive or negative. Negative variations are common, positive ones are rare if they exist at all. Variations causing interspecific sterility are obviously positive ones. Until an unquestionably sterile hybrid is produced by completely fertile parents that have arisen under observation from a single source, we have no acceptable knowledge of the origin of species.—Almost all variations observed at their origin are losses of something. Very few dominant mutations have arisen in *Drosophila*, and these would not be viable in nature. Variations observed in these forms and in domesticated animals and cultivated plants have nothing to do with the origin of species. Cooperation between systematists and geneticists is needed to solve these problems of origin.—*A. Franklin Shull.*

1768. BELLING, JOHN, AND ALBERT F. BLAKESLEE. **The assortment of chromosomes in triploid *Daturas*.** *Amer. Nat.* 56: 339-346. 1922.—The chromosomes of diploid, triploid, and tetraploid plants of *Datura Stramonium* can be grouped into 6 size classes. Diploids show 12 sets of bivalents, and triploids 12 sets of trivalents. In triploids, the distribution of the chromosomes is at random, 2 of each set going to one pole and 1 to the other. Detached chromosomes give rise to microcytes, and non-reduction results in giant pollen grains. The functional egg-cells have 12, 13, or 14 chromosomes, the smaller numbers being most frequent. In triploid progeny, the inheritance of 2 pairs of genes is trisomic. Plants with 1 extra chromosome show 11 bivalents and 1 trivalent, and plants with 2 extra chromosomes show 10 bivalents and 2 trivalents.—*M. E. Farnham.*

1769. BLAKESLEE, A. F., JOHN BELLING, AND J. ARTHUR HARRIS. **The probability established by a culture of given size that a mating is capable of producing only dominant individuals.** *Amer. Nat.* 56: 458-461. 1922.—Tables are given for providing a statistical criterion for the distinction between matings capable of producing only dominant individuals, and those which should give 1:1, 2:1, 3:1, 5:1, 8:1, 11:1, and 35:1 ratios of dominant to recessives. The need of such tables is discussed, and the theory upon which they are based is explained.—*M. E. Farnham.*

1770. BLAKESLEE, A. F., JOHN BELLING, M. E. FARNHAM, AND A. DOROTHY BERGNER. **A haploid mutant in the jimson weed, *Datura Stramonium*.** *Science* 55: 646-647. 1922.—Two

haploid ($1n$) *Datura* plants were secured in an attempt to induce chromosomal irregularities by exposure to low temperatures. Root cells showed 12 chromosomes, the normal (diploid) number being 24. The late prophase and metaphase of the 1st division of pollen-mother cells show 12 unpaired chromosomes only, which undergo a "reduction" into 3 plus 9, 4 plus 8, etc. These reduced groups divide in the 2nd division to form 4 cells, but young pollen grains with less than 12 chromosomes apparently all abort. Non-reduction takes place in some cells, resulting in 2 giant cells from each pollen-mother cell, and apparently forming surviving pollen grains equal in size to those from diploid plants. The haploid *Datura* is a new type among flowering plants since it is a sporophyte with the somatic chromosome number characteristic of the gametophyte, and since the chromosomes undergo a process of reduction without synap-
tic mates.—*J. Lincoln Cartledge.*

1771. CASTLE, W. E. The Y-chromosome type of sex-linked inheritance in man. *Science* 55: 703-704. 1922.—The condition in man called webbed toes is found only in males, and was reported to be transmitted from father to son, through 4 generations, independently of the female line of descent. It therefore has the distribution in heredity of the Y-chromosome. This type of hereditary transmission of characters has been observed also in 2 species of fish.—*H. W. Feldman.*

1772. CHEVALIER, AUGUSTE. L'origine du maïs d'après G. N. Collins. [Rev. of: COLLINS G. N. Origin of maize. *Amer. Anthropol.* 23: 503-506. 1921.] *Rev. Bot. Appl.* 2: 652-658. 1922.

1773. CHURCHILL, E. P., JR. The effects of so-called conjugation in shelled Rhizopods. *Amer. Nat.* 56: 466-470. 1922.—Individuals of *Diffugia corona* often pair off and attach themselves by their oral surfaces, suggesting a true conjugation. This attachment can often be brought about by subjecting 2 animals to distilled water for a few hours. In studying the effect of this process on inheritance, the author isolated, in each case, 2 specimens differing markedly in spine number or shell size. Each individual was allowed to divide and the daughter animals occupying the original shells were induced to undergo attachment by treatment with distilled water, which the other daughter animals were allowed to start asexual lines. In this way 2 lines were obtained from each of the original animals, 1 which had undergone apparent conjugation and 1 which had reproduced asexually. A comparison of these lines indicates that the progeny from one "exconjugant" was not influenced by the genetical constitution of the other "conjugant" or that there was no intermingling of hereditary characters. This in turn indicates that the process of attachment observed in *Diffugia* and other shelled rhizopods is not a true conjugation and that there is no interchange of nuclear material. At the present time the author has not been able to make a cytological study of the behavior of the nuclei during the process of attachment.—*W. H. Taliaferro.*

1774. CLAUSEN, R. E., AND J. L. COLLINS. The inheritance of ski wings in *Drosophila melanogaster*. *Genetics* 7: 385-426. 1922.—Ski wings, discovered by Clausen and Collins, was found by them to differ from wild-type in 2 previously unknown loci lying in the 2nd and 3rd chromosomes respectively. For the mutant genes to produce a visible variation in the wing those of both the 2nd and 3rd chromosomes must be present together,—the former Si_{II} either heterozygously or homozygously (being dominant), and the latter, si_{III} , homozygously (being recessive). Homozygous Si_{II} is not lethal, and tends to be more extreme than heterozygous. On account of these conditions, various unusual genetic ratios of ski to non-ski flies were obtained in crosses, but the genetic composition of flies with respect to ski genes can always be controlled, even where effects of the latter are invisible, by utilizing their linkage relations with other ("identifying") genes. Such methods were used by the authors in making up stocks for back-crosses to determine the exact loci of Si_{II} and si_{III} . For both determinations 3-point back-crosses were made, all 4 possible "complementary" arrangements of the 3 heterozygous pairs of genes being tested in order to reduce the error due to differential viability. Si_{II} was found to be at 30.8 (on basis of 1290 crossovers from star and 660 from

black among 4,845 flies) and si_{III} at 43.4 (740 crossovers from *dichaete* and 1605 from *spineless* among 15,621). Coincidence in former experiment was 43.8 per cent; in latter, 131.5 per cent in spite of the small distances involved. Viability of *ski* was about 90 per cent of non-*ski* in good cultures, lower in poor cultures; *ski* also tends to hatch later than normal. Under good conditions it is valuable for genetic work. In the theoretical discussion the authors point out reasons why the mutations of *Drosophila* cannot be explained away as recombinations.—*H. J. Muller*.

1775. COHEN, STUART, C. P. *Iets over selectie-pluk proeven*. [Notes on selection-pluck experiments.] *De Thee* 1: 101-106. 1920.—Eleven hundred plants have been included in an individual-yield study in a search for desirable parent plants. Extreme variability in yield was found, due partly to age differences. This variability was considerably reduced by separating the trees examined into 10 crown classes. Even within the same crown class there is much difference between different trees, and the differences are not entirely constant, a tree giving a good yield at one picking perhaps yielding poorly at a subsequent picking. This last fact may permit of analysis. For example, a low temporary yield for a plant may be correlated with a *Helopeltis* attack, indicating its susceptibility to the insect.—*Carl Hartley*.

1776. COHEN, STUART, C. P. *Productievermeerdering door selectie*. [Yield increase by selection.] *De Thee* 1: 68-71. 1920.—The author recommends preliminary selection of individual tea plants by 3 criteria: weight per tip, length of time elapsing before the shoot is ready for the next picking, and the number of side shoots arising from the cut ends. This has the advantage over selection based on determination of individual yields in that it requires less labor and permits the discovery of plants which are especially high in one or another of the above 3 characters and therefore valuable for crossing purposes. Weakness in one of the other characters might, however, keep the yield down and prevent detection by the total-yield method.—*Carl Hartley*.

1777. COOK, O. F. *One-variety cotton communities*. U. S. Dept. Agric. Bull. 1111. 50 p. 1922.—The author discusses importance of pure seed in cotton production, disadvantages of growing several varieties in the same community and difficulties under prevailing system of obtaining commercial quantities of pure planting seed of superior varieties, and of initiating production of such varieties. Present multiplicity of varieties or varietal names is shown to be an unfavorable factor in cotton production. Solution of the problem is believed to lie in organizing communities to grow only 1 variety. The advantages of such organization in facilitating field classing and orderly marketing of product and proper agricultural diversification are pointed out. Descriptions are given of communities already organized on 1 variety basis for the production of Pima, Meade, Durango, Acala, and Lone Star cottons.—*T. H. Kearney*.

1778. COURRIER, R. *Sur l'indépendance de la glande séminale et des caractères sexuels secondaires chez les poissons. Etude expérimentale*. [Independence of the seminal gland and secondary sex-characters in fishes. Experimental studies.] *Compt. Rend. Acad. Sci. Paris* 174: 70-72. 1922.—In *Gasterosteus aculeatus*, the male at breeding season possesses 2 secondary sex-characters: (1) rose-colored pigmentation of belly, and (2) a musky secretion of the renal cells. Testes of males caught in winter and kept at elevated temperatures develop exactly as those of males caught in summer, the breeding season. This induced development of testis is not accompanied by development of secondary sex-characters. Particularly is this true of the secretion of the renal cells, although the animal is kept at the same conditions of temperature and nutrition as in summer. A faint coloration of the males under the experimental conditions occasionally appears. The author concludes that the 2 secondary sex-characters of stickleback react differentially to the sexual hormone of the interstitial cells; there appears to be a quantitative difference. The amount of hormone required to influence the chromatophores is less than the amount necessary to cause the characteristic reaction of the nephrocytes.—*S. W. Geiser*.

1779. DUNN, L. C. A gene for the extension of black pigment in domestic fowls. Amer. Nat. 56: 464-466. 1922.—Black fowls differ by 1 dominant autosomal gene from Columbian and buff varieties in which black pigment is restricted to hackle, flight, and tail feathers. Black is incompletely epistatic over silver; black fowls therefore contain buff, the recessive allelomorph of this sex-linked gene. Evidence is derived from reciprocal crosses between Black Orpington and Columbian pattern (Light Brahma) fowls, and from backcrosses of F_1 with non-black individuals.—*H. W. Feldman*.

1780. DUNN, L. C. Inheritance of plumage color in crosses of buff and Columbian fowls. Amer. Nat. 56: 242-255. 1922.—The results of crossing Buff (Orpington and Ply mouth Rock) and Columbian (Light Brahma) varieties of fowls are reported. The 2 varieties were found to differ (1) in a dominant sex-linked gene (*S*, silver) which inhibits development of buff in the plumage of Columbian varieties; (2) by multiple genes governing the degree to which black is produced in hackle, wing, and tail feathers. It is suggested that Columbian and Buff varieties originally diverged through the occurrence of a gene mutation affecting the inhibition of buff, and through the subsequent accumulation by selection of factors for much black pigment in wing, tail, and hackle feathers of Columbian varieties; and by a reverse selection in Buff varieties.—*L. C. Dunn*

1781. DÜRKEN, BERNHARD. Versuche über die Erbllichkeit des infarbigem Lichte erworbenen Farbenkleides der Puppen von *Pieris brassicae*. [Studies on the inheritance of the coloration induced in the pupae of *Pieris brassicae* by colored light.] Nachrichten K. Ges. Wiss. Göttingen 1919: 428-434. 1919.—Of chrysalids from larvae of *P. brassicae* raised and allowed to pupate in orange light 77.8 per cent were green, 22.2 per cent being white and black. Only 7 per cent of those in control cultures raised in normal non-colored environment were green, 93 per cent being white and black. Orange light prevents the development of black and white pigments and allows the green blood and tissues to shine through the integument.—When merely the pupa during the process of pupation was exposed to orange light, 62.8 per cent of green pupae were obtained. Butterflies from these green pupae produced 98.2 per cent of green pupae when the larvae pupated in orange light, and 45.9 per cent green pupae when the larvae pupated in diffuse white light with gray background.—Pupal color depends in large measure upon that of the parents. Particularly, the green condition acquired by exposing the pupa to orange light was transmitted to unexposed progeny. Moreover, if the application of orange light is repeated by exposing the offspring, the effect is cumulative. Practically all the offspring of the next generation assume the acquired condition. Since the pupa at the time of the application of orange light is not yet sexually mature, the germ cells probably do not react immediately to orange light but acquire later the condition previously produced by the modifying agent in the medium that surrounds them.—Tentative conclusion: Pupation in orange light causes a specific chemical condition of the body saps. The germ cells acquire this condition. The transmission of this acquired character is not by the modification of special nuclear vehicles of heredity but by a change in the chemical plasmatic constitution of the gametes. The inheritance is not karyogenetic but plasmogenetic.—*John H. Gerould*.

1782. ENGLEADOW, F. L., AND J. P. SHELTON. An investigation upon certain metrical attributes of wheat plants. Jour. Agric. Sci. 12: 197-205. 1922.—One-year's results (1920) with pure lines of Polish and Kubanka wheats are reported from an investigation with the primary object of determining whether the ratio of length of glume to length of rachis would provide a "compensated" observation as a means of removing the masking effects of fluctuation due to unattainable uniform conditions of growth. A high correlation of glume-length and rachis-length was found in both wheats but the ratio of these quantities had as great a coefficient of variation as the absolute glume-length, and, therefore, the ratio possesses no special value in investigation. Correlations of about $+ .5$ were found among the tillers of any 1 plant for glume-length and rachis-length. With similar metrical observations it is concluded that observations should be confined to the main stalk of every plant and that it is desirable to limit the experimental population to plants with the same number of tillers. Weight of

mother seed was not correlated with degree of growth of plant as judged by lengths of glume and rachis.—*R. D. Lewis.*

1783. EYSTER, WILLIAM H. Scarred endosperm and size inheritance in kernels of maize. Missouri Agric. Exp. Sta. Res. Bull. 52. 10 p., 2 pl. 1922.—The character "scarred endosperm" (*Scsc*) appears as an irregular crater-like cavity in the endosperm on the abgerminal side near the crown of the kernel. The collapse of the pericarp over the cavity usually causes the appearance of "rough" indentation. Scarred kernels are smaller than normal kernels of the same ear, particularly in thickness, and are lighter in weight.—Scarred is inherited as a simple Mendelian recessive. The author points out that this, like various other characters in maize and other plants, is a quantitative character determined by a single factor difference.—*L. J. Stadler.*

1784. FABRICIUS, L. [Rev. of: (1) FRUWIRTH, C., UND TH. RÖMER. Einführung in die landwirtschaftliche Pflanzenzüchtung. (Introduction to agricultural plant breeding.) 160 p., 27 fig. Berlin, 1921. (2) BAUR, ERWIN. Die wissenschaftlichen Grundlagen der Pflanzenzüchtung. (Scientific basis of plant breeding.) 115 p., 11 fig. Berlin, 1921 (see Bot. Absts. 12, Entry 1034).] Forstwiss., Centralbl. 44: 119-121. 1922.—These books are brief and written in simple comprehensible language. The 1st emphasizes the practice, the 2nd the theory of plant breeding. They devote practically no space to breeding of forest tree species, for the good reason that foresters have done nothing beyond a little work on selection of seeds for planting. The difficulty of the longer generations in trees is pointed out. [See also Bot. Absts. 12, Entry 1831].—*W. N. Sparhawk.*

1785. FEDERLEY, HARRY. Ueber einen Fall von Criss-cross-Vererbung bei einer Artkreuzung. [A case of criss-cross inheritance in a species cross.] Hereditas 3: 125-146. 1922.—The dark, blue-black pigmentation and coarsely mottled pattern of the caterpillar of *Pygaera anachoreta* are dominant to the lighter color and finely mottled pattern of *P. curtula*. Save in a few details the 2 patterns are inherited as sex-linked units. F_1 caterpillars from *P. curtula* ♀ × *P. anachoreta* ♂ are alike in both sexes and resemble *P. anachoreta*, but F_1 from the reciprocal cross, *P. anachoreta* ♀ × *P. curtula* ♂ shows criss-cross inheritance. All the ♂♂ are dark and coarsely mottled like the mother; all the ♀♀ are light and finely mottled like the father. The F_1 species-hybrid ♀ is apparently sterile and matures so much later than the ♂ (the following season) that it has been impossible to obtain the F_2 , but *P. anachoreta* ♀ × the (*anachoreta*-like) F_1 ♂ has given numerous cultures and individuals of both sexes, all *anachoreta*-like save in minor details. *P. curtula* ♀ × the F_1 (*anachoreta*-like) ♂ has produced a few (*anachoreta*-like) ♂♂ only.—The chromosomes of the F_1 hybrid ♂ in gametogenesis do not conjugate, but divide equationally in maturation, each spermatozoon receiving a complete set of chromosomes of each species. Heterochromosomes are not distinguishable in either *P. anachoreta* (with its 30 chromosomes) nor in *P. curtula* (with 29), but assuming that $XX = ♂$, $XY = ♀$, and that the coloration of the 2 species, *a* and *e*, is borne by Xa and Xc , respectively, then the F_1 hybrid from *P. anachoreta* ♀ × *P. curtula* ♂, back-crossed with the ♀ of either species (XaY or XcY) would give only *P. anachoreta*, for the progeny receive in each case from the hybrid ♂ both Xa and Xc . Thus ♂♂ from each back-cross are "triploid and presumably contain also three X-chromosomes." "The females are also triploid, but these contain the allosomes XXY ." Intersexual individuals, poorly developed as a rule, are found among them. The Y-chromosome contains "factors which influence the differentiation of sex and develop specific female characteristics in spite of the presence of the two X-chromosomes which ought to ♂-mark the individuals." The sex-linked pigmentation factors, however, are not carried by the Y.—An anomalous *anachoreta*-like ♀ larva was found in a large brood from *P. anachoreta* ♀ × *P. curtula* ♂. Appearing simultaneously with the males it was mated with a brother, but no eggs developed. This individual is believed to have "arisen through non-disjunction in an egg of the heterogametic mother," ($XaXcY$). "It must have received the Y-chromosome from the mother; its development into a female would otherwise have been impossible. The Xa chromosome must also have been obtained

from the *anach.* mother; the *anach.* resemblance would not otherwise have been obtained."—*John H. Gerould.*

1786. GANTE, TH. Über eine Besonderheit der Begrannung bei Fatuoid-Heterozygoten. [On a peculiarity of bearding on fatua-like heterozygotes.] *Hereditas* 2: 410–415. 1922.—Nilsson-Ehle previously described a homozygous fatuoid mutation which differs from *Avena sativa* in that all flowering glumes are awned, rachis and kernel base are pubescent, and a basal ring is present. He found another mutation, a heterozygous fatuoid mutant, which segregates out in 1:2:1 ratio. This heterozygote is stronger awned than the normal, the awn is more bent, the base of lower kernel and rachis are more pubescent, and it has no basal ring. The author found that these heterozygotes have either all glumes awned or, where there are 3, the 2 lower ones. He states that this 2-awnedness does not depend on bud mutation, that no intermediate forms appear, and that it relates more to the modification of a varietal characteristic.—*L. J. Henning.*

1787. GOLDSCHMIDT, R., UND E. FISCHER. *Argynnis paphia-valesina*, ein Fall geschlechtskontrollierter Vererbung bei Schmetterlingen. [*Argynnis paphia-valesina*, a case of sex-controlled heredity in Lepidoptera.] *Genetica* 4: 247–278. 1922.—A "melanic" female variety, *valesina*, of the silver spot, *A. paphia*, occurs with the typical yellowish-brown female over the greater part of the palaearctic realm. The former alone occurs in the mountains of North China. Eastward, the proportion of dark females to brown diminishes. *Valesina* is rarely found with the type female in the low plains of Central Europe, and is not represented in North Africa, nor in Japan.—Fischer bred at Zürich (1915–1919) 4 lines of stock from a single Königsberg *valesina* ♀, the hibernating caterpillars of which matured in 1915 as 94 ♂♂, 35 ♀♀ *paphia*, 25 ♀♀ *valesina*. Methods are given for management of egg-laying (in large glass cylinders lined with netting) care of young caterpillars during their long fast and hibernation (from July, or August, to April), their feeding on leaves of the violet, and for the pairing of the butterflies.—Goldschmidt explains var. *valesina* as due to a single dominant non-sex-linked factor, *V*, the ♀ *Valesina* being *VV* or *Vv*, the ♀ *paphia* always *vv*. The ♂ is uniformly *paphia*-like, but may carry latent the *valesina* factor, being *VV*, *Vv* or *vv*. In regions in which *valesina* does not occur, the male is *vv*.—Nine combinations of the 3 genotypes of the male with the 3 of the female are possible. Six of them were represented in Fisher's cultures:

1. Male *vv* × female *vv* → 16 families, females all *paphia* (except 1 waif).
2. Male *Vv* × female *vv* → 5 families, females 104 *vv* + 68 *Vv*.
3. Male *VV* × female *vv* → 3 families, females 168 *Vv* (+ 1 stray *vv*).
4. Male *vv* × female *Vv* → 11 families, females 357 *vv* + 353 *Vv*.
5. Male *Vv* × female *Vv* → 13 families, females 143 *vv* + 367 (*Vv* + *VV*).
6. Male *VV* × female *Vv* → 1 family, females 21 (*Vv* + *VV*) all *valesina*.

Thus in only 1 case has a *valesina* ♀ produced only *valesina* offspring, and homozygous *VV* females do not appear as the mothers of broods. Is the *VV* combination lethal? 2.57:1 is the ratio derived from the *Vv* × *Vv* mating, indicating a shortage of *VV* ♀♀. Two of the largest families contain, respectively, 60 *Vv* + 30 *vv* and 61 *Vv* + 27 *vv* females, instead of 3 *valesina*: 1 *paphia*. *VV* females can be demonstrated as mothers in 2 mixed broods, assuming that the (wild) fathers must have been *vv*. Hence it is impossible that *VV* is lethal, even in the female, but a numerical summary shows that in this sex it is "semilethal," or relatively susceptible, and that the ♀ *Vv* is not quite so viable as the ♀ *vv*.—The peculiarity of sex-controlled heredity is that ordinary Mendelian segregation of one or more factors is phenotypically visible only in 1 sex. The explanation of this phenomenon must be physiological. It may be assumed either (1) that, in view of sex differences known to occur in the blood of Lepidoptera, the chemical constituents necessary for the realization of certain genes may be lacking in the male, through the genes are present, or (2) at the moment in the development of wing pigment when a sex-controlled factor is about to play its part, differentiation in the male has already reached a point at which no further change is possible, whereas differentiation in the female is not yet so far advanced and the organism therefore is susceptible to the action of the genetic factor. The latter explanation is regarded as the more satisfactory.—*John H. Gerould.*

1788. GOODSPEED, THOMAS HARPER, AND ROY ELWOOD CLAUSEN. **Interspecific hybridization in Nicotianas. I. On the results of backcrossing the F_1 sylvestris-Tabacum hybrids to sylvestris.** Univ. California Publ. Bot. 11: 1-30. 1922.—The authors summarize their "results" as follows: (1) Three *sylvestris* derivative lines, originating from backcrosses of F_1 *sylvestris-purpurea* hybrids to *sylvestris*, have been studied and shown to become identical with normal *sylvestris*. (2) One *sylvestris* derivative line from the *sylvestris-macrophylla* series has also been demonstrated to be identical with normal *sylvestris*. (3) A cross of a *sylvestris* derivative from the *sylvestris-purpurea* series with *purpurea* resulted in a dimorphic F_1 , which may be interpreted as evidence of the existence of a section of *Tabacum* elements in the *sylvestris* derivative. Since the *sylvestris* derivative was heterozygous for this section of *Tabacum* elements, this provides presumptive evidence of eventual purification of *sylvestris* derivatives by a process of zygotic elimination.—W. A. Setchell.

1789. GUTHRIE, F. B. **William J. Farrer, and the results of his work.** Dept. Agric. New South Wales Sci. Bull. 22. 26 p., 1 fig. 1922.—A biographical sketch is given of W. J. Farrer and a summary of his work. This pioneer wheat breeder graduated from Cambridge as senior wrangler in the mathematical tripos. He was strikingly successful in the production of wheat varieties combining the 3 characters high milling quality, resistance to stem rust, and drought resistance. Among the most important Farrer wheats produced have been Bobs, Federation, Comeback, Cedar, and Florence. Farrer's ideas in genetics are set forth and a Farrer bibliography is appended.—L. R. Waldron.

1790. GUYÉNOT, E., et K. PONSE. **L'organe de Bidder et les caractères sexuels secondaires du crapaud (*Bufo vulgaris* Laur.).** [The organ of Bidder and the secondary sexual characters of the toad (*Bufo vulgaris*).] Compt. Rend. Soc. Biol. 86: 751-752. 1922.—Harms had indicated that the secondary sex characters, such as sexual attraction, clasping reflex, etc., are dependent on the organ of Bidder. This statement is contradicted experimentally by removing the organ of Bidder from 10 toads and noting no diminution of secondary sex characters in these toads the following year. Another group of 26 had the testes removed and they showed none of the secondary sex characters. A 3rd group had the organ of Bidder and the testes extirpated and these toads showed complete absence of the secondary sex characters the following summer. The authors conclude that the secondary sex characters are dependent on the testes and not on the organ of Bidder. Also, the organ of Bidder is a rudimentary organ, as observed by them in the precocious development of a young male toad.—Oscar W. Richards.

1791. GUYER, M. F. **Studies on cytolytins. III. Experiments with spermatotoxins.** Jour. Exp. Zool. 35: 207-223. 1 fig. 1922.—Fowls subjected to repeated injections of rabbit sperm produce a spermatotoxic serum which is very toxic to rabbit spermatozoa *in vitro*, and variably toxic to rabbit spermatozoa *in vivo*. Complete sterility and degeneration of the spermatid tubules may be the result in extreme cases of this toxic action. In less extreme cases inactivation of many spermatozoa, or reduction of their number, or complete absence of them from the semen is frequently the result of such injections into the blood stream. These spermatotoxins produced in the fowl are equally toxic *in vitro* for the spermatozoa of rabbits and guinea-pigs. The rabbit is able to produce spermatotoxins against its own spermatozoa. Thus, males frequently injected intravenously with suspensions of their own spermatozoa showed weakened sperm-cells. The author holds that "since an animal can thus on occasion build antibodies against its own tissues when these have become misplaced or altered, and since antibodies can directly or indirectly affect the germ cells, it is reasonable to suppose that such influences may be the source of certain germinal variations."—S. W. Gieser.

1792. HAECKER, VALENTIN. **Einfach-Mendelnde Merkmale.** [Simple Mendelian characters.] Genetica 4: 195-234. 1922.—This is a discussion of the nature of simple Mendelian characters in terms of their developmental characteristics and of related problems of theoretical genetics. The 1st part deals with the difference between racial and specific characters

and presents arguments for the necessity of attacking the problem both from the angle of genetic behavior and phenogenesis. Phenogenesis aims to bridge the gap between characters of an individual and its germinal elements. Its method is to trace back on ontogenetic processes to the point at which divergence occurs and to determine whether differences rest on simple or complex causation.—Simple Mendelian characters exhibit simple causation and autonomous development, but irregularity in inheritance is associated with complex causation and correlative associations in development. The author states that simple Mendelian characters exhibit a series of peculiarities; particularly, high degree of ubiquity (parallel occurrence in taxonomically related forms), simple causation and autonomous development, and also a certain degree of irreversibility as shown by the occurrence of reverse mutations. He states that simple Mendelian characters in the widest sense correspond with racial characters; he argues that the higher the degree of ubiquity of a character, the simpler causation and greater autonomy it will exhibit in development. From these considerations he argues for the superficiality of simple Mendelian characters, and cites numerous examples in support of his theses.—The 2nd part of the paper is concerned with a discussion of difficulties inherent in present conceptions of the mechanism of heredity and with possible means of effecting an improvement in these conceptions. In general he commends attempts to appeal to cytology for an elucidation of genetic behavior, but holds that present mechanistic conceptions must eventually make way for physiological ones. He describes various features of the chromosome hypothesis, particularly linkage relations and crossing-over. Cytological difficulties in accepting Morgan's scheme are considered at length; other theories of linkage and crossing-over are also discussed. He holds that any attempt to develop relations of pure and impure segregation, linkage and recombination of linked factors to cytological results must satisfy these conditions: (1) the cytological processes must ultimately be expressed in physiological terms; (2) the pluripotency of the germplasm must be considered, the phenotypes corresponding to different potencies representing the simple Mendelian mutants; and (3) the occurrence of intracellular alterations of genes, whereby one member of a pair of genes may be altered prior to segregation (leading to imperfect segregation), must be recognized. The author argues that when 2 races differing in characters of simple causation are crossed the 2 germplasms are identical save in the particular factors separating the races and therefore produce no enzymes which alter the genes, consequently perfect segregation follows; but when parental forms differ in characters of complex causation alteration activities may occur followed by imperfect segregation or complicated hereditary phenomena. When one parent contains 2 linked mutant genes, he argues that recombination may be an evidence of alteration in genes, due to the greater complexity of such conditions, whereby one member of a pair is converted into the other in a definite frequency. Finally he points out that phenogenetic investigations indicate that all transition stages occur between simple Mendelian characters and those which exhibit irregular inheritance, and that since the underlying mechanism of heredity must be the same for all characters, a further search may disclose a more general principle, of which the present hypotheses are merely special cases.—*R. E. Clausen.*

1793. HALDANE, J. B. S. Sex ratio and unisexual sterility in hybrid animals. *Jour. Genetics* 12: 101-109. 1922.—“When in the F_1 offspring of two different animal races one sex is absent, rare or sterile, that sex is the heterozygous sex.” This rule is found to apply to practically all of the cases (44 references) so far observed.—*E. C. MacDowell.*

1794. HARRINGTON, J. B. The mode of inheritance of certain characters in wheat. *Sci. Agric. [Canada]* 2: 319-324. 1922.—Working with 6 well known Canadian wheats, the segregation for seed color occurred in both 3:1 and 15:1 ratios, red being dominant to white. The variety Kitchener has 2 factors for seed color, but Hard Red Calcutta and Red Bobs have 1 or 2 in different selected lines. Several factors appear to govern seed texture, the distribution in F_2 approximating the extreme range of the parent varieties. Two factors appear to be concerned in the production of fully awned spikes. Factors present in varieties studied are designated as follows: Hard Red Calcutta, *BBTT* (fully bearded); Taylor's Wonder, *BBtt* or *bbTT* (tip-awned); and White Bobs, *bbtt* (bald). These parental combinations reappeared

in the F_2 of a cross between the first and last varieties named together with several heterozygous forms intermediate between the parent sorts. *BBTt* and *BbTT* gave long tip-awns; *Bbtt* and *bbTt*, short tip-awns; and *BbTt*, fairly short. Chaff color segregated for dark red: light red: white in 1:2:1 ratio.—*C. E. Leightly*.

1795. HARRIS, J. ARTHUR, and H. D. GOODALE. The correction between the egg production of the various periods of the year in the Rhode Island Red breed of domestic fowl. *Genetics* 7: 446-465. 7 fig. 1922.—Annual egg records of 1,658 birds made during their 1st laying year of 365 days were studied. These records were all secured from the flock at the Massachusetts Agricultural Experiment Station during 1912-1919. Calculated correlation coefficients between the production of individual months and annual records indicate that the number of eggs laid by these hens during January, December, and September bear the closest relationship to annual production. The above correlations for the Rhode Island Red breed differ from the Storrs White Leghorns, where the highest correlation was found during July, August, and September. The months of January and September, respectively, show the 2 highest correlation coefficients to the production of the other 11 months of the year. The highest positive correlation between annual egg production and the deviation of monthly records from their probable value existed for December and a negative coefficient exists for March, April, May, June, and July. Correlation determinations between the production of individual months enabled the authors to apply 2 laws previously found applicable to the White Leghorn breed. "First, the correlation between the egg production of the individual months tends to become smaller as the months considered are more widely separated in time. Second, there is a more intimate correlation between the egg production of the autumn and winter months at the beginning and end of the contest year than between the egg production of these months and the productions of the spring and summer months."—*F. A. Hays*.

1796. HARRIS, J. ARTHUR, and ALBERT GOVAERTS. Note on assortative mating in man with respect to head size and head form. *Amer. Nat.* 54: 381-383. 1922.—Because of Pearson's suggestion that correlations indicating assortative mating may be due to the fact that husbands and wives are in general drawn from the same local races, and further, because of the importance attached by anthropologists to cephalic index as a character differentiating the races of Europe, the authors thought it desirable to obtain some measure of the correlation between husband and wife with respect to cephalic index. They used as material 319 Dutch families, finding the correlation between cephalic index of husband and wife within this racial group insignificant. The correlation between length of head of husband and wife is also insignificant, while the breadths may perhaps be significantly correlated.—*Sylvia L. Parker*.

1797. HAWKES, ONERA A. MERRITT. Studies in inheritance in the hybrid *Philosamia* (*Attacus*) *ricini* (Boisd.) ♂ × *Philosamia* *cynthia* (Drury) ♀. *Jour. Genetics* 12: 111-135. 1922.—Part II. Pupal characteristics. Cocoon color of *P. ricini* is pure white; of *P. cynthia*, red brown. In F_1 between the 2 species there were only intermediates. In succeeding generations there was no complete segregation, and the effects of moisture complicated the case. Part III. Imaginal characteristics. (1) Inheritance of color. *P. cynthia* and *P. ricini* differ strikingly in the color of the middle portion of the wings due (a) to arrangement of scales, and (b) to pigmentation of the scales. In F_1 the Vandyke brown of *P. ricini* is apparently dominant to the mottled yellow of *P. cynthia*, but microscopical examination shows the dominance to be incomplete due to the presence of a few colored scales of *P. cynthia*. In F_2 there was segregation of color into 4 groups, *DK* (dark, *ricini*-like), *DKK* (very dark, a new character), *LI* (light, *cynthia*-like), and *LII* (a new pale type). *LII* bred true for 3 generations, *DKK* for 2. No sex linkage, nor correlation between scale colors and the colors of the larva, was observed. (2) Inheritance of scale shape. Scales studied were taken from a limited area just beyond the outer angle of the lunule on the anterior right wing. Matings were made at random for 5 inbred generations. The *cynthia* characteristics (wide, several long prongs) showed the greater amount of influence in F_1 . F_2 showed greater variation but no segregation into original types. Two new forms appeared in the F_3 , (a) rapidly converging sides and (b)

barrel-shape. F_4 included 3 families with considerable homogeneity. The remaining families were similar to those in earlier generations. In F_5 some individuals have characteristic scales. The recessive, narrow, 2-5 pronged ricinian scale breeds true. In F_6 a new type of scale, barrel-shaped, is "apparently stable for one generation." It is concluded that shape of scales must be due to a number of independent factors for (a) length, (b) number of prongs, (c) relative length of prong, (d) parallel or converging sides. (3) Inheritance of size. As a criterion of size the distance from base of wing to middle of the eye spot was taken, which in *P. ricini* was 49 mm. and in *P. cyntia* 59 mm. F_1 individuals had approximately the size of *P. ricini*. In the 5 succeeding generations the sexual size difference of *P. cyntia* was lost. Hybridization apparently caused a break-up of the sex complex of *P. cyntia*. No complete segregation occurred. Inbreeding was detrimental to size only to a very small extent; fertility was not impaired. (4) Sex ratio. F_1 showed an excess of females (63 ♀, 46 ♂), but all succeeding generations an excess of males. (5) Inheritance of white hairs on the abdomen of *P. ricini* vs. brown with tufts of white in *P. cyntia*. No regularity of inheritance was noticed. Every variation between *P. ricini* and *P. cyntia* was produced, but the extremes were rare.—Lloyd C. Fogg.

1798. HILSON, G. R. Uniformity of length of cotton hairs. Agric. Jour. India 16: 564-566. 1921.—Methods are discussed for rapid determination of length of fiber in cotton breeding. Close correspondence is found between results obtained by measurement of numerous individual fibers and by Balls' "maximum combed length" method.—T. H. Kearney.

1799. HORLACHER, L. J., and E. S. GOOD. Breeding experiments with Kentucky mountain ewes. Kentucky Agric. Exp. Sta. Bull. 243. 137-199, 69 fig. 1922.—An account is given of 6 years' breeding work in an attempt to improve the characteristic of the progeny and eventually build up the flock by the use of pure bred rams. The progeny of mountain ewes with Hampshire, Cheviot, Southdown, Rambouillet, and mountain rams were compared and some of these hybrids were again crossed with either a ram of the same breed or of another breed. The per cent of twin lambs produced by the above named rams respectively was 71.8, 63.9, 44.1, 37.5, and 31.5. The Rambouillet was the most satisfactory ram used for improving the mountain ewes. The grade Hampshire lambs gained more rapidly but lacked quality. The Southdown grades possessed quality but gained slowly and the ewes were too small. The Cheviot grades grew more rapidly than Southdown grades and had finer quality than Hampshire and Rambouillet grades. Use of pure bred rams increased the weight of the fleece from 5 pounds to 5.74-7.52 pounds.—W. D. Valteau.

1800. JONES, SARAH V. H. Studies on inheritance in pigeons. IV. Checks and bars and other modifications of black. Genetics 7: 466-507. 13 fig. 1922.—The "bluing" series in pigeon color is described in 6 types according to the amount of blue color in the plumages. These are classified as epistatic in hereditary behavior in the same order. The types are named (1) full black, (2) black blue-tail, (3) medium check, (4) sooty blue, (5) blue black-barred, (6) blue barless. Factor *S* effects a uniform distribution of pigment in the barbules of black feathers while *s* indicates the clumped condition in blue feathers. Black thus differs from barred in a single factor shown by breeding tests. Breeding tests between 5 pairs of heterozygous blacks gave 25 blacks and 8 checks, a typical monohybrid ratio. Eleven matings between individuals heterozygous for check gave 59 checks to 18 barred, indicating a 3 to 1 ratio. A factor *C* is postulated which is not linked to *S* but can act only in the presence of *s* to produce the checked patterns. A factor *T* hypostatic to *S* accounts for class 2, black blue-tail birds. Factor *S_o* accounts for sooty. Barless is known only to be recessive to barred *B_a*. These factors are not of a multiple allelomorphic series.—F. A. Hays.

1801. KEARNEY, THOMAS H. The uniformity of Pima cotton. U. S. Dept. Agric. Circ. 247. 6 p. 1922.—Evidence that cotton varieties do not "run out" if protected from cross-pollination and mixture of seed is afforded by the history of Pima variety of American Egyptian cotton. A method is described of maintaining a supply of good planting seed of this variety

and evidence given from roguing statistics and from results of specially planned experiments that purity of this variety has been preserved during 7 years of commercial production in Arizona.—*T. H. Kearney*.

1802. KOEHLER, OTTO. *Neuere Arbeiten über hennenfiedrige Hahne*. [New studies on hen-feathered cocks.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 73-82. 1922.—This is a German review of several recent papers on hen-feathering.—*O. E. White*.

1803. KOEHLER, OTTO. [German rev. of: GEROULD, JOHN H. *Blue-green caterpillars: The origin and ecology of a mutation in hemolymph color in Colias (Eurymus) philodice*. *Jour. Exp. Zool.* 34: 385-412. 1 pl. 1921 (see *Bot. Absts.* 11, Entry 1348).] *Zeitschr. Indukt. Abstamm. u. Vererb.* 29: 141-143. 1922.

1804. KUTTNER, O. [German rev. of: BANTA, ARTHUR M. *Selection in Cladocera on the basis of a physiological character*. *Carnegie Inst. Washington Publ.* 305. 170 p. 1921.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 141. 1922.

1805. LANCEFIELD, D. E. *Linkage relations of the sex-linked characters in Drosophila obscura*. *Genetics* 7: 335-384. 1922.—*D. obscura* is slightly larger and of a darker color than *D. melanogaster*. It breeds readily in the laboratory, and requires 14-20 days for a generation. Forty mutations have been produced, of which $\frac{1}{2}$ are dominant. Some are very similar to those of other species. Twenty-eight sex-linked mutations have appeared in 23 loci. The linkage groups, of which there are 5, correspond to the haploid number of chromosomes. Non-disjunction of the sex-chromosome was not observed in 309 suitable cultures. Frequent crossing-over between sex-linked characters gives the X-chromosome a total "length" of 170 units. Evidence suggests that the size differences of the X-chromosomes of *D. melanogaster* and *D. obscura* are due to the presence of a large piece of chromosome attached at what corresponds to the left end of the *D. melanogaster* X. Linkage studies indicate that similar genes do not have the same arrangement in *D. obscura*, as in *D. melanogaster*. Descriptions of sex-linked characters of *D. obscura* are presented.—*W. H. Feldman*.

1806. MATHEWS, J. WRENFORD. *Cross-breeding for wool and mutton. Results of experiments*. *Dept. Agric. New South Wales Farmers' Bull.* 132. 61 p., 24 fig., 4 charts. 1920.—The long wool breeds (Lincoln, Leicester, and Border Leicester) are more valuable for mating with the Merino than the down breeds (Southdown, Shropshire, and Dorset Horn). The Merino ewe is to be preferred to the long wool ewe because of environmental conditions. For natural increase the Leicester breed showed 6 per cent superiority to either Lincoln or Border Leicester. The Border Leicester surpassed Lincoln and Leicester as parent in value of lamb carcass for export, in body weight, fleece weight, fleece value, and generally in mutton value.—*L. R. Waldron*.

1807. MENDIOLA, N. B., and J. R. MAGSINO. *Study of bud variation in Codiaeum variegatum*. *Philippine Agric.* 11: 19-22. 2 pl. 1922.—Eighteen varieties of *C. variegatum* (L.) Blume (Croton) were studied and each was subjected to several different treatments of soil and exposure. The author reports that, after 1½ years, a case of terminal and one of lateral bud mutation involving the same shape of leaf, and a change from broad to slender shape, were found in one variety; in this variety, also, a bud mutation involving a change in leaf coloration was found. These variations grew true to type when cuttings were made.—*Sam F. Trelease*.

1808. NACHTSHEIM, H. [German rev. of: SCHMALTZ, R. *Das Geschlechtsleben der Haussäugetiere*. (The reproduction of domestic animals.) 3rd rev. ed., 529 p., 67 fig. R. Schoetz: Berlin, 1921.] *Zeitschr. Indukt. Abstamm.-u. Vererb.* 29: 143. 1922.—Nachtsheim hails this revised edition as of great value to geneticists and others who wish an exhaustive account of the physiology of reproduction of domestic animals. He regrets that in the discussion of the numerous theories of sex-determination no mention is made of the relations of chromosomes to sex.—*Sewall Wright*.

1809. NILSSON-EHLE, H. **Über freie Kombination und Koppelung verschiedener Chlorophyllerbinheiten bei Gerste.** [Coupling and independent combination of distinct chlorophyll factors in barley.] *Hereditas* 3: 191-199. 1922.—Six factors for chlorophyll development in barley were tested for their genetic relationship. These included 3 factors for white seedlings, 2 for yellow, and 1 for a chlorina type. Only 1 case of linkage was found, that between 1 of the white factors and the chlorina. Deviation from an F_2 ratio of 9 green: 3 chlorina: 4 white seemed to indicate a correlation which was substantiated in the F_3 progenies from green F_2 plants. Instead of a 1:2:2:4 proportion of different progenies, a 0:9:12:126 ratio was found. On the basis of 5 per cent "Koppelung," or crossing-over, the data are in better accord. Factor interrelations between the other chlorophyll factors are discussed.—*E. W. Lindstrom.*

1810. ORTON, J. H. **The phenomena and conditions of sex-change in the oyster (*O. edulis*) and *Crepidula*.** *Nature* 110: 212-214. 1922.—Of 1 year old oysters, the smaller ones were males and the larger ones were either females or had spawned as females or were changing or had changed into males. The author concludes that all oysters are born males, but may change into females at the age of 1 year. Changes noted were actually observed to occur within 1 year in 1 particular individual. A parallel rapidity in sex-change was observed in *Crepidula*. Probable causes of sex-change are discussed, but it is concluded that the information is insufficient for their determination. The view is favored that the factor for sex-causation is within control of the individual and not in external conditions. Observations are recounted which show that male *Crepidulae* favorably situated with respect to females may function as males for long periods, but when isolated rapidly change to females.—*R. E. Clausen*

1811. PATEL, M. L. **Studies in Gujarat cottons. Part I.** Mem. Dept. Agric. India Bot. Ser. 11: 75-127. 8 pl., 7 fig. 1921.—Descriptions are given of varieties of *Gossypium herbaceum* grown in Gujarat, India, and of selected strains of the Goghari variety. Heritable characters are enumerated and correlation and variation discussed. The author's conception of the ideal type of *herbaceum* cotton is presented.—*T. H. Kearney.*

1812. PEARL, RAYMOND, AND SYLVIA L. PARKER. **Experimental studies on the duration of life. IV. Data on the influence of density of population on duration of life in *Drosophila*.** *Amer. Nat.* 56: 312-321. 1922.—The authors find a significant correlation between the length of life of *Drosophila* and the number kept in a bottle. As to the form of the regression line, which appears to be significantly askew, they reach the provisional conclusion that "(a) the lowest density is not the optimum; (b) the mean, duration of life tends to increase with increasing density up to a certain point which is optimum; (c) after the optimum region has been reached, increasing density is associated with diminished duration of life, which presently falls below the lowest figure found with densities below the optimum."—*Sewall Wright.*

1813. PEARL, RAYMOND, AND SYLVIA L. PARKER. **Experimental studies on the duration of life. V. On the influence of certain environmental factors on duration of life in *Drosophila*.** *Amer. Nat.* 56: 385-405. 1922.—The authors find that the mean duration of life for *Drosophila* of wild type is about 10 per cent greater in bottles which allow free ventilation in the mouth than in bottles with cotton plug stoppers. No effect of ventilation was found in a relatively short-lived stock with vestigial wings and other recessive characters. The feeding of embryonic juice, either from the chick or from the larvae of *Drosophila*, was without effect on longevity.—*Sewall Wright.*

1814. PEARL, RAYMOND, AND SYLVIA L. PARKER. **On the influence of density of population upon the rate of reproduction in *Drosophila*.** *Proc. Nation. Acad. Sci. [U.S.A.]* 8: 212-219. 1 fig. 1922.—Matings were made (in standard half-pint bottles containing constant volume of food) with different numbers of parent flies varying from 1 to 50 pairs per bottle. The progeny from these matings were counted and the rate of reproduction—per female per day—obtained for each density. The rates were found to decrease very regularly as the density of

the parental population increased. A graph is given showing the goodness of fit of the curve, $\log y = a - bx - c \log x$, fitted by least squares to the series of points. The relation between this curve and Farr's Law relating death rate to density of population is discussed.—*Sylvia L. Parker.*

1815. PHILLIPPS, W. J. **Hybridism of *Salmo irideus* and *Salmo fario* in Australasia.** New Zealand Jour. Sci. and Technol. 5: 98-100. 1922.—This is a discussion of all work on trout hybridization in Australasia and a tabulation of results in detail obtained from crossing brown and rainbow trout both ways. Rainbow ♂ × brown ♀ may under certain conditions cross, while the reverse cross is less likely to materialize. Hybrids as compared with parents have minimum vitality and except in rare cases would not successfully compete with parents. They are often abnormal and frequently die a few days after the yolk-sac is absorbed. In rare instances, hybrids develop to sexual maturity, but whether progeny of F_1 hybrids could continue the race is unknown.—*Orland E. White.*

1816. PLATH, O. E. **Notes on the hybrids between the canary and two American finches.** Amer. Nat. 56: 322-329. 1922.—The following crosses are reported: yellow canary × California linnet, yellow canary × willow goldfinch, and willow goldfinch × Arkansas goldfinch. Results indicate that dark color is dominant to yellow. Earlier observations by others that mottling in such hybrids is due to a gene carried only by canaries was not confirmed.—*F. A. Hays.*

1817. RUEDEMANN, RUDOLF. **Additional studies in arrested evolution.** Proc. Nation. Acad. Sci. [U.S.A.] 8: 54-55. 1922.—A brief statement is presented of an investigation of the possible influence, recorded in the fossils, of the different modes of propagation upon the persistence of types.—*R. Ruedemann.*

1818. RUEDEMANN, RUDOLF. **Further notes on the paleontology of arrested evolution.** Amer. Nat. 56: 256-272. 1922.—In continuation of his previous studies of the causes of persistence in animals, the writer had investigated the possible influence of the different modes of propagation upon the persistence of types and had found that all the lower modes of propagation, viz., propagation by simple division, by budding, by hermaphroditism, and by parthenogenesis, are distinctly favorable to persistence, mainly through diminution in the frequency and range of variability as far as it is induced by fertilization. A clue to the mechanics of the processes involved in persistence is believed to be found in the views recently advanced by Dürken and Salfeld on the methods of inheritance and production of new characters by means of the genes or character-determiners of the heredity-chromatin [see Bot. Absts. 11, Entry 2431]. These authors hold that external influences act first upon the cytoplasm, which in part directly influences the heredity-chromatin and in part is changed by long-continued strain, by way of inceptive genes (plasmogenes), into true genes. The conditions which produce persistent types are not able to stimulate the cytoplasm sufficiently to lead to the formation of new genes.—*R. Ruedemann.*

1819. SEREBROVSKY, A. S. **Crossing-over involving three sex-linked genes in chickens.** Amer. Nat. 56: 571-572. 1922.—The genes suke (slow feathering), trage (barring), and tuge (silver) were studied. All 3 are present in Barred Plymouth Rocks, whereas the Russian Orloff chickens have none of them. All are sex-linked. A cross gave in F_1 all Barred Rock type of males slow feathering and all black females that developed feathers rapidly. Cross-overs occurred in these F_1 males so that in F_2 the Plymouth Rock color was combined with quick feathering and black color with slow feathering. One suke-tuge-atrage chick appeared, being slow-feathering and silvery but non-barred.—*F. A. Hays.*

1820. SHAMEL, A. D. **Recent bud-selection work in citrus and other industries.** California Citrograph 7: 358, 370-371, 386. 3 fig. 1922.—Some bud variations are inherited, while others are transitory effects of the environment. In various cases reviewed (apple, potato,

sugarcane, citrus), superior individuals within a clonal variety have given superior progeny. The author's bud-selection work aims to (1) secure improved varieties; (2) isolate improved strains of established varieties; (3) improve the average performance of valuable strains. In sugarcane, superior "stools" (plants) are selected and propagated. "In progenies grown from such selected stools less than 1 in 100 have proved to be inherently stable." About half of the world's sugarcane sugar is produced by "varieties which originated as bud mutations." Two lemon orchards propagated from high-yielding trees are mentioned; there are no control trees, but the orchards are remarkable for their uniformity and for their early and high production. In comparative tests, "evidence has been secured that the superior and inferior strains of our citrus varieties can be isolated by bud selection. Furthermore, the progenies of the highest-yielding parent trees have thus far given us the highest and best yields, while the progenies of the low-yielding parent trees of these same strains have given us the lowest and most undesirable yields."—Howard B. Frost.

1821. SINNOTT, EDMUND W. **Inheritance of fruit shape in Cucurbita pepo.** Bot. Gaz. 74: 95-103. Fig. 1-3. 1922.—Starting with commercial varieties the author was able to isolate through inbreeding a number of contrasting pure lines. The tendency toward sterility in most cases was found to disappear by the 4th generation. The cross of a certain spherical type ("sphere") with 3 varieties of the flat fruit type ("disc") indicated definite dominance of the latter with but 1 factor functioning. In 2 of the crosses the author obtained spheres in the F_2 which were decidedly flatter than the parent sphere type and the discs also were decidedly deeper than the parent disc type. This condition of things, it is pointed out, may readily be explained "by assuming that there is a second dominant flattening factor, considerably weaker in its effect than the major one [mentioned above] and segregating independently of it." Since the squashes which are longest are also those which are narrowest (the sphere type) and those which are thinnest are also those which are widest (the disc type) it is held "that shape determining factors actually exist, and that the facts here set forth are not due merely to the segregation of size factors."—B. W. Wells.

1822. SINNOTT, EDMUND W., AND ALBERT F. BLAKESLEE. **Structural changes associated with factor mutations and with chromosome mutations in Datura.** Proc. Nation. Acad. Sci. [U. S. A.] 8: 17-19. 1922.—Of the 3 gene mutants in *Datura*, the white-flowered form showed no structural differences; the smooth-capsuled form differed from the normal in having sharper angles, shorter internodes, thicker stems, and greater difference between the 2 branches at a fork; while the few-noded form had shorter main stem, shorter internodes, thinner stems, and greater difference between the 2 branches at a fork. Of the 12 forms with an extra chromosome each, Reduced had a shorter main stem, sharper angles, and thinner stems; Cocklebur had wider angles, thinner stems, and shorter internodes; Globe showed shorter internodes, thicker stems and more difference between the 2 branches at a fork; while Buckling had wider angles than the normal. Differences in the wood fibers, the vessels, and the sclerenchyma were also noted. The tetraploid plants also showed definite external and internal differences from the normals.—John Belling.

1823. SPINKS, G. T. **Fruit breeding investigation.** Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1920: 61-65. 1920.—Notes are presented on the progeny of crosses between varieties of apples, pears, plums, cherries, currants, gooseberries, raspberries, strawberries, and tomatoes.—W. H. Chandler.

1824. STEIN, EMMY. **Über den Einfluss von Radiumbestrahlung auf Antirrhinum.** [Effect of radium-rays on Antirrhinum.] Zeitschr. Indukt. Abstamm.- u. Vererb. 39: 1-15. 1922.—The growing point of shoots of *Antirrhinum*, variety "Delila" from Baur's cultures, were exposed for varying lengths of time to a radium preparation consisting of 30.2 mgm. radium-barium-sulphate enclosed in a glass tube imbedded in a platinum capsule. Of the 3 types of rays emanating from this preparation, only the β and γ were active, the latter being the most effective. Exposures were made in a dark room. Exposures of 5-10 minutes had no percep-

tible influence. Exposures of 20-160 minutes checked growth temporarily and caused floral abnormalities of several types; later the plants resumed normal behavior. Exposures on a 2nd series varying from 2 to 72 hours produced another type of abnormal behavior. In all the experiments of this type abnormal behavior was temporary and results were negative as far as producing mutants is concerned.—The author also exposed seed of *Antirrhinum* from Baur's cultures; the technique is given in detail. All seed exposed 45 minutes germinated. Longer periods of exposure resulted in decreased percentage of germination in proportion to length of exposure. Seed exposed 1.5 hours produced seedlings with small, white, wrinkled cotyledons. Still longer exposures gave plants with undeveloped cotyledons and a high mortality. In other cases the vegetative point failed to develop. In still others the flowering period was greatly retarded. A large number of plants from exposed seed showed only cotyledon injury and 10 of these at flowering time were selfed and "bagged" and exposed to radium rays, resulting often in sterility. Some of the aberrant forms ("radium-plants") produced by the exposed seed are regarded as true mutants, as no such plants ever arose among the controls. These forms, though largely sterile, in a few cases gave rise to progeny which resembled them, and in one case this resemblance was repeated to the 2nd generation. When propagated by cuttings these "radium-plants" preserved their characters faithfully, though single branches often reverted to normal except for their sterility. Most important aberrant types were: (1) forms with small, "horn tipped" leaves, luxurious growth, pale flowers; (2) forms with small leaves and elongated flowers; (3) forms defective in form and color of leaves and flowers, flowers split with parts undeveloped or grotesque in shape; (4) dwarf forms (6-8 cm.), flowerless, small leaves, and shortened internodes. Flowerless dwarf form of this type was also secured from pollination of normal with pollen that had been exposed.—*C. S. Gager.*

1825. TANAKA, TYOZABURO. A new feature of bud variation in Citrus. U. S. Dept. Agric. Dept. Circ. 206. 8 p. 1922.—The Wase variety of Satsuma orange (*Citrus nobilis* Lour. var. *unshiu* Swingle) is probably the result of bud variation, some explanations of which are as follows: (1) bud variation may be the same as germinal mutation; (2) somatic segmentation of a Mendelian recessive; (3) periclinal chimeras. References numbering 23 are appended.—*L. R. Hesler.*

1826. TANAKA, Y. Sex-linkage in the silkworm. Jour. Genetics 12: 163-178. 1 pl. 1922.—The author describes a sex-linked recessive, translucent skin in the caterpillar. The female is heterozygous for sex as in other Lepidoptera. Three exceptional males, perhaps due to non-disjunction, were observed. He states that there are also at least 7 non-sex-linked genes, all recessive, that cause various degrees of translucence in caterpillars. Crosses are reported of sex-linked to non-sex-linked translucents, with complex F_2 ratios, that agree sufficiently well with the expectations.—*A. H. Sturtevant.*

1827. TOENIENSEN, E. Ueber die Entstehung erblicher Eigenschaften durch cytoplasmatische Induktion. [On the origin of hereditary characters through cytoplasmic induction.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 16-25. 1922.—Cytoplasmic induction is the transmission to, or induction in, the germ plasm of changes produced in the cytoplasm by some outer stimulus. *Bacterium pneumoniae* under strong influence of its own metabolic products is made to produce 3 mutants. Mutant III has practically no virulence. Virulence is restored to half its original value by 80 mouse passages. Upon further cultivation on agar these mutants with restored virulence lose some, but not all, of it. Thus it appears that during the mouse passages virulence was being gradually restored, but more rapidly to the cytoplasm than to the germ plasm. The amount of regression on agar represents the cytoplasmic modification which had not yet been impressed on the germ plasm. Therefore the character is first impressed on the cytoplasm which then passes it on to the germ plasm.—*II. M. Smith.*

1828. VENKATRAMAN, T. S. A simple pollinating apparatus. Agric. Jour. India 16: 203-206. 1 fig. 1921.—A method is described and figured of pollinating sugar-cane by collecting pollen in a gelatin capsule, which is inserted in the free end of the rubber tube of a blowing

bulb. The capsule is then punctured lengthwise with a needle and pressure on the bulb releases a spray of pollen. The author mentions a method of testing viability of sugar-cane pollen by germination on stigmas of a species of *Datura*.—*T. H. Kearney*.

1829. WEBBER, H. J. *Citrus root-stock problems*. California Citrograph 7: 391, 408-411. 7 fig. 1922.—This is a general discussion, with conclusions and recommendations about as in a previous publication [see Bot. Absts, 5, Entries 498-1785.] In the orchard test of large, intermediate, and small nursery trees the average size differences in 1922 were, with 1 slight exception, in the same sense as in 1919 (previously reported), and markedly in favor of the larger nursery trees. The large trees have also decidedly exceeded the smaller ones in yield. Similar results are now reported for a commercial orchard of 60 acres, of which successive thirds were planted respectively with large, intermediate, and small Valencia orange trees from the same nursery rows. Both commercial varieties and selected stock seedlings in orchard planting show great differences in size and vigor as well as in other characteristics; in view of this fact it is very probable that the persistent size differences among young budded trees are largely due to genetic differences among the stocks.—*Howard B. Frost*.

1830. WRIGHT, SEWALL. *Coefficient of inbreeding and relationship*. Amer. Nat. 56: 330-338. 1922.—Pearl has built up a coefficient of inbreeding based on the smaller number of ancestors in each generation back of an inbred individual as compared with the maximum possible number, and a partial inbreeding index which brings in coefficients of relationship between ancestors. The author suggests that a more direct measure of the effects of inbreeding may be obtained from the percentage of homozygosis which would follow on the average from a given system of mating, taking a formula which makes the coefficient run from 0 to 1 while the percentage of homozygosis is running from 50 to 100 per cent. The various formulae are developed from the method of path coefficients discussed by the author in a series of papers [see Bot. Absts. 10, Entries 143, 144, 145, 146, 147].—*Sylvia L. Parker*.

1831. ZADE. [German rev. of: (1) FRUWIRTH UND ROEMER. *Einführung in die landwirtschaftliche Pflanzenzüchtung*. (Introduction to agricultural plant breeding.) 150 p., 4 pl., 27 fig. Paul Parey: Berlin, 1921.] (2) BAUR, ERWIN. *Die wissenschaftlichen Grundlagen der Pflanzenzüchtung*. (The scientific principles of plant breeding.) 111 p., 6 pl., 11 fig. Gebrüder Borntraeger: Berlin, 1921 (see Bot. Absts. 12, Entry 1034.) Zeitschr. Indukt. Abstamm. -u. Vererb. 29: 139-140. 1922.—[See also Bot. Absts. 12, Entry 1784.]

HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issue Entries 1562, 1585, 1600, 1623, 1626, 1631, 1775, 1776, 1820, 1823, 1825, 1829, 1882, 2129, 2132, 2134, 2157, 2158, 2159, 2218)

FRUITS AND GENERAL HORTICULTURE

1832. ANONYMOUS. [Report by the Netherlands Minister to China.] *Iets over de thee-cultuur in China*. [Note on tea culture in China.] De Thee 2: 53-54. 1921.—Tea is not cultivated in China on the same basis as in Ceylon, British India, and Java. It is rather a by-crop, grown in mixture with other crops, or on the dykes of rice fields. Direct seeding is practiced rather than the planting out of nursery stock. There is no pruning worthy the name. Picking is done only during about 3 weeks of the year, and by no special system. It is seldom that more than 3000 bushes are found under 1 ownership, and the factories have no control over the raw product. Better methods of handling the product must be practiced before Chinese tea can regain its importance in the market.—*Carl Hartley*.

1833. ANONYMOUS. *Sixteenth annual report of the government cinchona plantations and factory in Bengal for the year 1921-22*. 4 + xii p. Bengal Secretariat Book Depot: Calcutta,

1922.—The report gives the acreage in *Cinchona Legeriana*, and *C. succirubra* on different plantations as well as notes on the percentage of quinine secured, cost of production, extraction, packing, etc., including a detailed financial statement.—*A. J. Pieters*.

1834. ALLEN, W. J., and W. LEG. BRERETON. The packing of fruit. New South Wales Dept. Agric. Farmers Bull. 130. 46 p., 50 fig. 1920.—Detailed descriptions and illustrations are furnished for packing apples in the standard Australian bushel case. Variations in tiers, packs, and row counts allow for 21 different counts ranging from 45 to 210 fruits per case. Packing in the Canadian case is also illustrated and discussed. Brief notes are given for packing pears, peaches, and citrus fruits in cases and half cases. Eight standard packages are described in detail.—*L. R. Waldron*.

1835. BALLOU, F. H. Lessons from 1921 orchard work. Ohio Agric. Exp. Sta. Monthly Bull. 7: 63-67. 1922.—The author mentions briefly a few of the effects from neglect in spraying in southeastern Ohio due to the failure in the fruit crop. Observations are also given regarding the resistance of certain varieties to spring freezes.—*R. C. Thomas*.

1836. BALLOU, F. H. Response of sweet clover to phosphatic fertilizer. Ohio Agric. Exp. Sta. Monthly Bull. 7: 68-72. Fig. 1-3. 1922.—The conditions under which the test was conducted are briefly outlined. Certain advantages and disadvantages of sweet clover in orchard culture are mentioned. A test comparing the value of nitrate of soda alone at the rate of 200 pounds per acre, also with the addition of a similar amount of acid phosphate, demonstrated a very marked increase in yield of sweet clover due to the phosphatic fertilizer.—*R. C. Thomas*.

1837. BALLOU, F. H. Spraying hillside orchards. Ohio Agric. Exp. Sta. Monthly Bull. 7: 82-87. Fig. 1-5. 1922.—The writer presents methods of overcoming difficulties in spraying hillside orchards in southern Ohio. Special reference is made to the terraced roads and water supply. The illustrations accompanying the article are aptly chosen.—*R. C. Thomas*.

1838. BARKER, B. T. P. Root development in newly planted trees. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1920: 43-60. 1920.—This reports a study of root growth during the 1st year in the orchard of trees planted in the following ways: (1) root fibers retained, tree unrammed, branches pruned; (2) root fibers retained, tree unrammed, branches unpruned; (3) root fibers retained, tree rammed, branches pruned; (4) root fibers retained, tree rammed, branches unpruned; (5) root fibers removed, tree unrammed, branches pruned; (6) root fibers removed, tree unrammed, branches unpruned; (7) root fibers removed and roots cut, tree unrammed, branches pruned; (8) root fibres removed and roots cut, tree unrammed, branches pruned; (9) root reduced to short stump, tree unrammed, branches pruned; (10) root reduced to short stump, tree unrammed, branches unpruned. All were apple trees on Paradise roots. Trees having different root treatments were also planted in sand and others were grown with the roots in water.—With the trees in open ground there was no apparent difference in top growth on the different plots. Regardless of the treatment given very few new roots were formed except from that part of the main stock within 3-4 inches of the surface of the soil; this was true of 29 of the 30 trees lifted. New roots started from the older ones of 1 tree; this, it is thought, could not have been true Paradise stock.—With the trees growing in sand, new roots started from older roots from base to end. Apparently the larger number of new roots started near wounds made on the roots. As in the case of trees growing in soil the treatment of the roots at planting seemed to have no important influence on the character of the new root system.—The roots growing in water showed very great enlargement or callous-like growths of the lenticels. Both new root growth and this growth of lenticels slackened toward the end of the growing period, finally ceasing. The roots were then less resistant to the fungus growing upon them.—*W. H. Chandler*.

1839. BARKER, B. T. P., and A. H. LEES. Factors governing fruit-bud formation. (Pruning.) Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1920: 19-42. 1920.—The paper

reports results of a study of the effect on fruit-bud formation of the method of pruning trees on supports advocated by Lorette in his book of 1913 (*La Taille Lorette*). It is naturally a study of very severe summer pruning. Thus, for wood shoots of 1 year's growth only, Lorette recommends cutting to 1-2 leaves at the base when the shoots are about the thickness of an ordinary lead pencil at the base, or about 10-12 inches long, or just beginning to lignify at the base; and for wood of more than 1 year's growth (short piece of wood of 1 or more year's growth) he recommends leaving 1 wood shoot (the weakest) and cutting it to 1 visible eye. He recommends leaving spurs and cutting to 1 eye any wood shoot that may be present. For treatment of twiggy shoots (*Brindilles*) he recommends cutting to 3 eyes or bending downward, and for the "bourses" or "knobs" (cluster bases), cutting to the basal leaf or to 2 visible eyes any wood shoots arising. The authors summarize their experience at Long Ashton (England) as follows: "(a) Pruning hard to obtain stipulary eyes for flower formation is very unsatisfactory. (b) Pruning to the basal cluster where present is far better, but results in occasional failures. (c) Where no basal cluster exists a cut to two visible eyes, not three, should be made. (d) The time of year, the state of lignification at the base and the presence or absence of basal clusters should be used for criteria rather than the length or thickness of the shoot. (e) *Brindilles* should be cut to two eyes where they cannot be safely left, not to three. The bending down method is hopeless except for a garden. (f) Shoots from bourses should be cut as close as possible, if carrying fruit; if not, treatment should be according to whether large dards are present or not." The results are discussed in relation to the theory of Loeb that growth inhibiting substance moves backward from the terminal portions of growing shoots. The authors think that results with this Lorette system of pruning are in agreement with Loeb's theory. Suggestions for practice in sections with rather humid climates like that of Long Ashton are given.—*W. H. Chandler*.

1840. [BERNARD, CH.] *Groenbemesters*. [Green manures.] *De Thee* 1: 100-101. 1920.—Ten reasons are given for the tea experiment station's regular recommendation that green manures be planted between the tea.—*Carl Hartley*.

1841. BERNARD, CH. *Het teeren van snoeiwonden*. [The tarring of pruning wounds.] *De Thee* 1: 15-17. 1920.—Tests were made on tea pruning wounds of 2 tars from a local petroleum company, 1 from a gas factory, and 1 from an unknown source. Application was delayed 1-2 days after pruning to allow the surfaces to dry. The petroleum "tars" proved variable, and consisted probably of asphalt dissolved in a light petroleum. The coal tar and the unknown tar penetrated deeply, especially in the cambium and bast regions, presumably due to phenol compounds. Discarding the yellow oil found separated out in the tins, and washing the residue with water before using, decreased the injury. The brownish tar from the petroleum company failed to cover the exposed wood properly. The black petroleum tar made a good cover, and at the end of a year good callus growth was noted. The results confirm earlier tests in showing the undesirability of phenol-containing tar-like substances for wound treatment.—*Carl Hartley*.

1842. [BERNARD, CH.] *Hoe lang blijft een thee-aanplant productief?* [How long does a tea plantation remain productive?] *De Thee* 1: 14-15. 1920.—Tea gardens that are well cared for should show no permanent diminution of yield up to the age of 20-30 years. A case of marked increase in yield following pruning and fertilization with boengkil (peanut or kapok seed cake), bone meal, and wood ashes is described.—*Carl Hartley*.

1843. [BERNARD, CH.] *Sesbania als groenbemester*. [*Sesbania* as a green manure.] *De Thee* 1: 18-19. 1920.—*Sesbania aegyptiaca* has given good results on some tea plantations, including places where lamtoro (*Leucaena glauca*) will not grow. It is a small tree, with light shade, easily propagated, and fast growing. Natives (in West Java) use its seed as a substitute for coffee, its foliage for fodder; they obtain a diuretic extract from the leaves, and in sections deficient in wood the tree serves as a source of fuel.—*Carl Hartley*.

1844. BERNARD, CH. *Verpakking van Formosa-thee*. [Packing of Formosa tea.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Proefsta. Thee Mededeel. 71. 3 p. 1920.—Formosa tea shippers by more careful grading and more durable packages have gained an advantage over Java tea shippers in the U. S. A. market.—*Carl Hartley*.

1845. BERNARD, CH. *Verslag van het Algemeen Proefstation voor Thee over het jaar 1920*. [Report of the General Experiment Station for Tea for the year 1920.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Proefsta. Thee Mededeel. 74. 64 p. 1921.—Brief report of the activities of the station, including those of the chemist, botanist, and agriculturist. The working plan and budget are given for 1921.—*Carl Hartley*.

1846. BERNARD, CH. *Verslag van het Proefstation voor Thee over het jaar 1919*. [Report of the Experiment Station for Tea for the year 1919.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Proefsta. Thee Mededeel. 69. 23 p. 1919.—This is the administrative report for 1919, budget for 1920, and report of the experimental garden, showing graphically the monthly yield and parallel rainfall and sunshine observations.—*Carl Hartley*.

1847. BERNARD, CH., EN C. P. COHEN STUART. *De theecultuur in Japan en in de Shanlanden*. 1. Enkele aantekeningen betreffende de theecultuur in Japan. 2. Gegevens betreffende de theecultuur in Siam en Burma. [Notes on tea culture in Japan, Siam, and Burma.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Proefsta. Thee Mededeel. 73. 34 p., 7 fig., 2 maps. 1920.—In addition to the Dutch text are given as appendices a letter in English from the Director of Agriculture of Burma describing the tea culture there; and a list, with accompanying maps, of places in Burma where either wild or cultivated tea is known to occur.—*Carl Hartley*.

1848. BERNARD, CH., EN M. KERBOSCH. *Voorloopige mededeeling omtrent het verenten van thee*. [Preliminary communications on the grafting of tea.] De Thee 1: 97-100. 2 pl. 1920.—Graftage is a promising method of perpetuating selected seed-stock. It has not been tested long enough to determine how much productiveness depends on root system and how much on the quality of the top. Ten years' experience however indicates that grafted plants, aside from growth vigor, have the habit and other characters of the scion parents. It is much more difficult to get successful grafts in tea than in *Cinchona*, methods which give 98 per cent with *Cinchona* succeeding in 20 per cent or less of the attempts with tea, the same experienced workers having been employed for both. Crown grafting, by a method illustrated in detail drawings, gave 50 per cent good unions and subsequent strong growth. Marcotting (girdling scion branches and letting them develop their own roots in balls of earth before removing them from the parent tree) gives good results and will be useful in selection work, though not adapted to large-scale operations.—*Carl Hartley*.

1849. BIOLETTI, FREDERIC T. *Some common errors in vine pruning and their remedies*. Univ. California Agric. Exp. Sta. Circ. 248. 8 p. 1922.—It is almost impossible to find 2 vines that should be pruned in exactly the same manner. Some of the errors in pruning are: (1) Failure to modify the pruning according to the strength of the vine or cane. This results in irregular crops and a decrease in quality. (2) Serious injury to the vine or its destruction by attempting to obtain excessive crops without regard to the annual growth. (3) Adopting systems which in their nature can not be permanent, i.e., vertical canes and vertical cordons.—*A. R. C. Haas*.

1850. BORZA, A. *Flora grădinilor țărănești române*. I. Mărul (*Pyrus Malus* L.) [The flora of the Roumanian peasant garden. I. The apple tree.] Bul. Inform. Grăd. Bot. Muz. Bot. Univ. Cluj 1: 64-87. 1921.—In this contribution are scientifically studied for the first time the apple types of Roumania. As a type *Malus pumila* Mill. is especially concerned in its varieties *domestica* C. K. Schneider and *dasyphylla* A. & G. Besides, there are forms which may be derived from *M. sylvestris* Mill. On the other hand, kinds derived from *M. baccata*

Borkh. are rare, and from *M. astracantha* Dum.-Cours. and *M. prunifolia* Borkh., it is scarcely possible to recognize descendants. In addition to a catalog of 150 local types, there are 27 types improved by the Saxons, Szklers and Magyars and 9 types of recent importation.—*M. Tiesenhausen*.

1851. BRADFORD, F. C. The relation of temperature to blossoming in the apple and the peach. Missouri Agric. Exp. Sta. Res. Bull. 53. 51 p., 5 pl., 4 fig. 1922.—The author presents data on temperature accumulation to the time of blossoming of peach and apple at several stations. The amount of heat measured in day-degrees received by peaches from Jan. 1 to blossoming varies with the season and varies more with the locality. Microscopic examination of the blossom buds of apple indicates different stages of advancement in the fall and different rates of development during winter in different varieties. Observations on branches forced in the greenhouse indicate that late blossoming in the apple is connected with rest period influence rather than different temperature requirements. Similar differences between varieties of peach seem to be masked at Columbia, Missouri.—*O. W. Letson*.

1852. BRADFORD, F. C., and H. A. CARDINELL. Observations on winter injury. I. Early and late winter injury. II. An aftermath of winter injury. Missouri Agric. Exp. Sta. Res. Bull. 56. 26 p., 8 pl. 1922.—I. The killing of fruit buds in the apple occurred early in 1921 and 1922. The Jonathan variety appeared to be injured to the extent of about 10 per cent, while other varieties were injured noticeably less or not at all. The evidence indicates that the injury was due to immaturity. The 2nd bloom was shown not be a result of injury to the normal bloom.—II. This portion of the bulletin contains observations made on a young orchard planted from nursery stock that had been injured by low temperature, while the more resistant cambium was not destroyed. When the trees were pruned they did not heal properly and several fungi gained entrance. Recommendations for dealing with such cases are given.—*O. W. Letson*.

1853. BUNYARD, E. A. Variegated fruits. Gard. Chron. 72: 168-169. 1922.—Cases of variegation in the fruits of orange, lemon, pear, apple, grape, currant, and gooseberry are noted. These variegations are found in green, red, pale, and yellow colors. In some varieties 3 of these color forms are known. These are supposed to originate as bud sports, and may occur in more than 1 locality, and for this reason claims for exclusive right of propagation can not be maintained.—*P. L. Ricker*.

1854. CARPENTER, FORD A. The trustworthiness of thermometers used by California fruit growers. Bull. Southern California Acad. Sci. 21: 21-27. Fig. 1-3. 1922.—The thermometers used by southern California fruit growers, especially since the war, have been noticeably inaccurate, only 6 per cent of those submitted to the practical research department of the Los Angeles Chamber of Commerce being accurate. Because of this inaccuracy great expense has been occasioned the fruit growers because of smudging when it was unnecessary. The sources of error, methods of calibration, proper placing of the thermometers in the orchard, and types of thermometers are discussed.—*Roxana Stinchfield Ferris*.

1855. CASTELLA, F. DE. Spring grafting of old-established vines. Jour. Dept. Agric. Victoria 18: 610-614, 680-687. Fig. 1-7. 1920.

1856. CASTELLA, F. DE. Twenty years of reconstitution. Jour. Dept. Agric. Victoria 18: 481-492. 1920.—This is a plea for the use of American vine stocks to combat the attacks of *Phylloxera*. The mild climate of Australia is favorable for success with *Phylloxera*-resistant stocks, especially if the best varieties are chosen and the soil carefully prepared. The effect of stock on scion is also discussed.—*Wm. E. Lawrence*.

1857. CHEVALIER, AUG. Comptes rendus du premier congrès du châtaignier. [An account of the first chestnut congress.] Rev. Bot. Appl. 1: 375-380. 1921.—A number of recent papers on the chestnut are reviewed.—*Paul Russell*.

1858. COHEN STUART, C. P. *De theezaadtuinen van Java en Sumatra*. [The tea seed gardens of Java and Sumatra.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Proefsta. Thee Mededeel. 75. 32 p., 13 fig. 1921. [With English summary.]—Tea seed growing is profitable, but when the 1,380 acres now in seed gardens become of full bearing age the local market will be over supplied and the poorer gardens forced out. The utilization of the seed of such gardens for oil extraction is suggested. A period of approximately $1\frac{1}{2}$ years intervenes between the formation of buds and the ripening of the seed, so that direct relation between climatic conditions and yield is not easily traced. In order to ensure full maturity, the taking of seed only after its fall from the tree is advised. Criteria for the selection of seed-tree stock are not yet absolutely established.—*Carl Hartley*.

1859. [COHEN STUART, C. P.]. *Hooge productie door zorgvuldigen pluk en insektenbestrijding*. [High production by careful picking and insect control.] *De Thee* 2: 5-7. 1921.—High yields at a Java tea plantation which picks only the pecco and 2 next leaves are reported. Extensive tests show that of the 4-leaf picking these first 3 leaves constitute 60 per cent by weight, the 4th leaf 26 per cent, and the oldest internode 14 per cent. Three-leaf picking however yields 66 per cent of the yield obtained in 4-leaf picking, due to the axillary bud of the leaf left on the plant.—*Carl Hartley*.

1860. COHEN STUART, C. P. *Iets over de middelen om oogstvermeerdering te verkrijgen*. [On the methods of getting increased yields.] *De Thee* 1: 46-49. 1920.—Brief consideration is given of picking system, soil conditions, pruning system, spacing, shade, disease control, and the hereditary qualities of the tea plants. The author has shown that a picking system including pecco and 1 leaf gives 200-300 per cent more yield than if the pecco only is taken; pecco and 2 leaves give a further increase of 150-200 per cent; 100-130 per cent further increase by a p+3 system; and 60-80 per cent further increase by a p+4 system.—*Carl Hartley*.

1861. COHEN STUART, C. P. *Nog iets over pluktermen*. [Something more about picking terms.] *De Thee* 1: 8-13. 1920.—This is an explanation of a number of terms, mainly Sundanese, in use in the Java tea industry.—*Carl Hartley*.

1862. COHEN STUART, C. P. *Snoeltermen*. [Pruning terms.] *De Thee* 2: 33-45. 3 fig. 1921.—Eight types of pruning are figured, and for each are given the Dutch and native names in use in West Java, and in some cases also the English name. Various Sundanese terms connected with pruning are also translated into Dutch, as for example the names of different kinds of branches, of pruning instruments, and of different methods of making the pruning cuts. Details of the different ways of making the individual cuts are illustrated.—*Carl Hartley*.

1863. [COHEN STUART, C. P.]. *Verzameling van leguminosen en onkruiden*. [Collection of legumes and weeds.] *De Thee* 2: 7-8. 1921.—The General Experiment Station for Tea [Buitenzorg, Java] is developing a herbarium including types and developmental stages of tea, relatives such as *Camellia* spp., the legumes used as green manures on tea estates, and the commoner weeds.—*Carl Hartley*.

1864. COLLINS, JAMES H. *How does fruit get damaged en route?* *Florida Grower* 26¹⁵: 6-7. 1 fig. 1922.—This is a general consideration of the strength of fruit boxes and types of nails and wood being used. The handling of boxes in fruit cars and their condition during transit until they reach the market are also discussed.—*J. C. Th. Uphof*.

1865. CRIDER, F. J. *The olive in Arizona*. *Arizona Agric. Exp. Sta. Bull.* 94. 493-528. 1922.—The author emphasizes the best practices in successful olive culture, based on investigations made by the Arizona Experiment Station during the past 26 years. The statement is made that Arizona may become one of the great olive-producing centers of the world because of the ideal climatic and soil conditions, absence of serious diseases and insects, and quality of the fruit produced.—*Herbert C. Hanson*.

1866. DEUSS, J. J. B. *Aluminium in plaats van lood voor theeverpakking.* [Aluminum in place of lead for tea packing.] *De Thee* 2: 24. 1921.—Aluminum is to be recommended. It has been shown however that lead is not dangerous for use in tea packing, as even mouldy tea in lead cases is entirely free from lead.—*Carl Hartley.*

1867. DEUSS, J. J. B. *De oolong thee van Formosa.* [The oolong tea of Formosa.] *De Thee* 2: 19-23. 1921.—The history and relatives of this tea are described, and a general account of tea culture in Formosa is given.—*Carl Hartley.*

1868. DEUSS, J. J. B. *De verpakking van Java-thee.* [The packing of Java tea.] *Dept. Landb. Nijv. en Handel [Nederland.-Indië] Proefsta. Thee Mededeel.* 71. 4-12, 14 fig. 1920.—Needed improvements in packing cases and packing methods are described.—*Carl Hartley.*

1869. DEUSS, J. J. B. *Grondbedekking in theetuinen.* [Mulching in tea gardens.] *De Thee* 1: 106-107. 1920.—Mulching with all sorts of available plant material has been tested on a large scale in a Java plantation, and the results appear excellent. Good physical condition, addition to soil humus, and weed control result. Alangalang, a coarse grass, is much employed; by laying the cut blades along the soil contours erosion is prevented.—*Carl Hartley.*

1870. DYKHUIS, J. *Italian fruit stocks.* *Nation. Nurseryman* 30: 312, 314. 1922.

1871. ELLENWOOD, C. W. *Notes on five year results of apple pruning.* *Ohio Agric. Exp. Sta. Monthly Bull.* 7: 58-61. 1922.—In an experiment to determine the relative value of no pruning, light summer pruning, light dormant pruning, heavy pruning, pruning after foliage appears, and light dormant pruning, it was found that the last method gave the most satisfactory result. The 5-year results from the various types of pruning, including in each plot 10 trees, are expressed in tabular form showing the number of pounds of fruit produced in each case classified as "firsts," "seconds," and total yield.—*R. C. Thomas.*

1872. G[ARRETSSEN], A. J. *Tijdelijk verlaten theetuinen.* [Temporarily abandoned tea gardens.] *De Thee* 2: 51-53. 1921.—The malaise has forced the temporary or partial abandonment of certain tea plantings. To prevent the development of jungle, difficult to eradicate when management is resumed, it is advised that gardens temporarily abandoned be first planted to some legume tall enough to shade out weeds, even though it also somewhat shade the tea. *Cajanus indicus* is recommended as a valuable fodder plant as well as soil improver. *Tephrosia candida* is less desirable because of slow growth, but can be used on poorer soils than the *Cajanus*. *Sesbania aculeata* does very well for the 1st year, but later not so well.—*Carl Hartley.*

1873. GEORGESON, C. C. *Report of work at Sitka station.* *Rept. Alaska Agric. Exp. Sta.* 1920: 12-20. *Pl. 1.* 1922.—According to this report some nursery stock suitable for Alaskan conditions was distributed and strawberry breeding work was continued. The growing of raspberries, currants, and gooseberries is reported. A hybrid between the Cuthbert raspberry and the native yellow salmonberry has been produced and named Bensonberry; it is a weak grower. Yellow Transparent and Livland Raspberry apples are recommended but no other tree fruits. Success with ornamental shrubbery, herbaceous perennials, and annual flowering plants is described. Hyacinths, tulips, and Narcissi are successful both indoors and out. Cabbage, cauliflower, onions, beets, turnips, peas, and celery are the vegetables reported. Of potatoes 45 varieties were grown in addition to 223 varieties originated at the station and known by numbers. Notes on the greenhouse and its management are given.—*J. P. Anderson.*

1874. GROVE, OTTO. *Single variety ciders and perries.* *Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta.* 1920: 86-90. 1920.—This report concerns the quality of cider or perry made from varieties of apples or pears.—*W. H. Chandler.*

1875. HAMMOND, A. A. **Small fruit culture. The gooseberry.** Jour. Dept. Agric. Victoria 18: 717-732. Fig. 16-30. 1920.—This report also treats of currants.—Wm. E. Lawrence.

1876. HAMMOND, A. A. **Small fruit culture. The raspberry.** Jour. Dept. Agric. Victoria 18: 672-679. Fig. 13-15. 1920.

1877. HEDRICK, U. P. **Cyclopedia of hardy fruits.** viii + 370 p., frontispiece, 16 pl. (colored and halftones), 325 fig. Macmillan Co.: New York, 1922.—This volume is designed as a successor to Downing's Fruits and Fruit Trees, Thomas' American Fruit Culturist, and other like volumes of the past century. It describes 104 species and 1,200 varieties, which list includes the fruits that are now grown in America. The author states that "The chief value of a book like this lies in the accuracy of the descriptions and of the determinations of synonyms. Herein the author has had an advantage over the old pomologists, since his connection with a modern experiment station with a large collection of fruits and a good horticultural library, has given him opportunity to describe first hand and pass impartial judgment on the varieties, and to go to original sources for names; whereas, the old writers, lacking these modern facilities were compelled to copy one from the other."—The ways in which the author designed the manual to be useful are: (1) to aid in the identification of varieties; (2) to guide in the choice of varieties; (3) to sort the names now in the use for varieties of hardy fruits and assign them to the varieties to which they belong; (4) to state in what regions the varieties described grow best; (5) to tell when and where the varieties originated; and (6) by depicting choice products of the orchard, to stimulate the desire to grow better fruits.—The volume was prepared for fruit-growers, nurserymen, students in colleges and high schools, county agricultural agents, and buyers of fruits. For the more elaborate and technical descriptions and historical accounts of varieties the specialist in pomology is referred to the series of fruit books prepared by the same author and published by the New York [Geneva] Agricultural Experiment Station.—J. H. Gourley.

1878. KERKHOVEN, A. R. W. **Lamtoro en kalkbemesting. [Lamtoro and lime fertilizing.]** De Thee 1: 18. 1920.—Lamtoro (*Leucaena glauca*) grows well in limestone outcrops where tea grows poorly, while in non-lime soils, where tea grows well, the lamtoro grows poorly. Various fertilizer tests on lamtoro gave good results whenever lime was included.—Carl Hartley.

1879. LAFFER, H. E. **The pruning of the vine.** New South Wales Dept. Agric. Farmers' Bull. 140. 42 p., 25 fig. 1921.—Eleven principles governing growth and fruit production are cited as a basis for practical pruning. Comparative advantages are discussed with reference to spur and rod pruning and the possibility of developing spurs and rods (under necessity) from water shoots. Methods of framework renewal are described. The following pruning systems are discussed and illustrated: (1) bush or goblet, (2) Thornery spalier, (3) multiple-armed spalier, (4) Bordelais spalier, and (5) Casenave's cordon. Brief notes are given on training the vine in the home garden. [See also Bot. Absts. 9, Entry 1425.]—L. R. Waldron.

1880. LARSEN, J. A. **Some characteristics of seeds of coniferous trees from the Pacific Northwest.** Nation. Nurseryman. 30: 246-249. 2 fig. 1922.—"Germination tests and observations on the characters of seeds of coniferous trees native to Montana and northern Idaho show that the seed is liable to serious injury by storage of the cones in wet condition; that the extraction of the seed under temperatures above 120°F. and in such hot and very humid air reduces the viability of the seed; that sterilization to prevent damping-off or bad molding is apt to injure seed of small, thin seed coats; that the rate of germination of seeds which ordinarily germinate slowly may be hastened materially by reduction of the impervious seed coat; and that coniferous seeds often remain viable in dry storage from eight to ten years."—J. H. Gourley.

1881. NESS, H. **Cultivation and care of trees on the farm in Texas.** Texas Agric. Exp. Sta. Bull. 293. 76 p. 1922.—Texas soils suitable for orchards are described. Plans for woodlots for shelter and other uses are given, together with the care and kinds of trees for each. Grafting and budding are briefly described and illustrated. Methods of planting and transplanting various trees are explained.—*L. Pace.*

1882. PRESCOTT, E. E. **Pomological committee conference at Hobart, April, 1920.** Jour. Dept. Agric. Victoria 18: 602-606. 1920.

1883. REINISCH, E. F. A. **The weakening effect on a species of plants of being continually reproduced by artificial means.** Trans. Kansas Acad. Sci. 30: 62-63. 1919/1921 [1922].—The methods of artificial reproduction, the history of Lombardy poplar and the necessity of, and the directions for, extreme care of its cuttings to prevent decay of the pith are discussed.—*F. C. Gates.*

1884. SAATHOFF. **Behelfskulturen für bedrohte Blumen- und Herrschaftsgärtnereien. I. Die Champignon-Kultur.** [Mushroom-culture.] Gartenwelt 26: 387-390. 5 fig. 1922.—Mushroom growing is described, as conducted by the firm Marquardt in Zossen. Two types of spawn are available, hard and loose, growers preferring the latter as it is easier to distribute over the beds. The beds are made in spring and summer, of horse manure from stables where the animals are fed on oats and hay. It is heaped and worked over for a period of 8 days and then mixed with dry leaves of linden (*Tilia*), donkey manure, and decayed sod. The mixture is placed in beds 40-50 cm. high and is compacted by tramping. When the soil temperature has gone down to 28°C. the spawn is planted. The mushrooms are grown in semi-darkness in cellars, stables, sheds, mines, catacombs, etc. Harvesting begins after 2-3 months.—*J. C. Th. Uphof.*

1885. SCOTT, L. B. **Progress of nursery stock investigations by Department of Agriculture, U. S. A.** Nation. Nurseryman 30: 198, 200. 1922.

1886. SIAHAJJA, E. L. **Een vergelijking van keprisan en schoonsnoei.** [A comparison of skiffing and stick pruning.] De Thee 2: 45-48. 1921.—The 2 methods are compared in detail in 11 respects. The former is cheaper and quicker, it results in earlier production, but must also be repeated sooner, and results in decreased productivity in later years and more damage from *Helopeltis* if the insect is not combatted. Skiffing, however, facilitates 1 method of *Helopeltis* control and yields better grade tea. Various factors control choice of the pruning method. In young vigorous gardens skiffing gives excellent results, while in old gardens it results in 1 excellent flush and practically nothing more. The comparison is for skiffing and stick pruning made at equal height above the ground.—*Carl Hartley.*

1887. SKVORTZOW, B. W. **Notes on the agriculture, botany, and zoology of China.** Jour. North China Branch Roy. Asiatic Soc. 52: 79-111. 9 fig. 1921.—Chiefly economic data are presented on poppy culture, mountain rice, apricots, plums, fruit culture at Foochow, etc. The paper presents in addition slightly over 7 pages devoted to a bibliography of the botany, zoology, and rural economy of Manchuria, the papers being very largely by Russian authors.—*E. D. Merrill.*

1888. SMITS, J. P. **Keprisan en schoonsnoei.** [Skiffing (top pruning) vs. stick pruning.] De Thee 1: 72-73. 1920.—Experience on the author's plantation in Java indicates that the skiffing of tea gives better results on poor soils than on good soils. This is attributed to the fact that on the good soils the skiffing results in such heavy production of "Chanji leaves" (resting buds) that it is impossible to maintain clean picking unless exceptionally large forces of pickers are available. This "Chanji leaf" production is therefore not replaced by pecco and in 8 months another pruning is needed.—*Carl Hartley.*

1889. VINSON, A. E., F. J. CRIDER, and G. E. THOMPSON. **The Yuma Mesa.** Arizona Agric. Exp. Sta. Bull. 89. 225-263. 1919.—A commission consisting of an agricultural chemist, a horticulturist, and an agronomist studied the soils, climatology, and crops grown on the Yuma Mesa. The following factors make this region of the greatest promise for citrus culture: efficient shipping facilities, favorable soil and irrigation water, freedom from citrus pests, and the smallest rainfall, lowest relative humidity, and greatest percentage of sunshine of any citrus region in North America. The commission recommends that the Mesa be brought under irrigation and developed by the growing of citrus and other sub-tropical fruits.—*Herbert C. Hanson.*

1890. VON OVEN, F. W. **Selecting superior varieties.** Amer. Bot. 28: 153-154. 1922.—Emphasis is placed upon the desirability of noting superior varieties, as shown by the character of leaves, flowers, or fruits as they occur in the open.—*S. P. Nichols.*

1891. WALLACE, T. **Trial cider orchards.** Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1920: 91-95. 1920.—A report is made of mechanical and chemical analyses of the soils of some of the trial cider orchards.—*W. H. Chandler.*

1892. WHITTLE, C. A. **The pineapple pear.** Florida Grower 28¹²: 5. 1922.—This pear variety is resistant to blight and is valued more than Kiefer by canners. The yield is exceedingly heavy. Only a few orchards in the South are planted to this variety.—*J. C. Th. Uphof.*

1893. WICHMANN, H. J. **Report on determination of pectin in fruit and fruit products.** Jour. Assoc. Official Agric. Chem. 6: 34-40. 1922.—The present tentative official method of determining pectin by alcohol precipitation is unreliable and a new method is submitted.—*F. M. Schertz.*

1894. WILDEMAN, E. DE. **Quelques considérations sur les bananiers.** [Notes on bananas.] Rev. Bot. Appl. 1: 241-269. 1921.—The writer has sought for several years to arouse interest in this group of plants, especially those varieties found wild and cultivated in central Africa. He believes that certain species of *Musa* are indigenous to central Africa, though this region need not be considered as the original source of all bananas. A number of recent papers and books on the banana are discussed, including the well known book by Fawcett, published in 1913; O. W. Barrett's paper in Philippine Agric. Rev. July, 1912; Robertson Proschowsky's paper in Petite Rev. Agric. et Hort. July 8, 1917; and the article by W. J. Allen and R. G. Bartlett in Agric. Gaz. New South Wales [see Bot. Absts. 7, Entry 947]. These publications only go to show the necessity of a profound study of the entire question in all of its aspects; this study should include consideration of the distribution of the species and varieties, detailed examination of each species and variety, with the particular uses and cultural requirements of each. The banana wilt and other diseases and also insect pests should be thoroughly investigated. The species of *Musa* discussed include *M. sapientum*, *M. paradisiaca*, *M. Cavendishii*, *M. textilis*, *M. religiosa*, *M. arnoldiana*, *M. ensete*, *M. superba*, *M. rosacea*, and *M. Gilletii*. Two analyses of the common banana are given to show the food value, and the banana as a source of alcohol is briefly considered.—*Paul Russell.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1895. ANONYMOUS. **Display of perennial asters.** Brooklyn Bot. Gard. Rec. 11: 121-122. 1922.—The 1st season's results with varieties of *Aster novae-angliae*, *A. novi-belgii*, and *A. Amellus* grown in 1922 at Brooklyn Botanic Garden are recounted. The plants were obtained from Aldenham House gardens, near London.—*C. S. Gager.*

1896. ANONYMOUS. **Old garden flowers. III.** Amer. Bot. 28: 95-97. 1922.—*Monarda* is considered.—*S. P. Nichols.*

1897. ANONYMOUS. **The Dahlia.** Gard. Chron. 72: 164. 1922.—Notes are given on the recent exhibition of the National Dahlia Society and a brief discussion of the introduction of the Dahlia into England.—*P. L. Ricker.*

1898. ANONYMOUS. [Rev. of: TRELEASE, WM. **Plant materials of decorative gardening: The woody plants.** 2d ed. rev., xliii + 177 p. The Author: Urbana, Illinois, 1921.] Nature 110: 177. 1922.

1899. BIRD, HENRY. **Gardening in an artificial bog.** Amer. Bot. 28: 97-102. 1922.—Directions for making and planting an artificial bog are given.—*S. P. Nichols.*

1900. BROTHERSTON, R. P. **Calceolaria.** Gard. Chron. 72: 52. 1922.—Annual species were introduced into cultivation a century ago, but the first shrubby species as early as 1777. The history of their cultivation and some of the literature are reviewed.—*P. L. Ricker.*

1901. DRESSEL, JOH. **Treiben von Zwerg Iris—Iris pumila.** [Forcing of the dwarf Iris.] Möllers Deutsch. Gärtnerzeitg. 37: 206. 1922.—At the beginning of winter the rhizomes of *Iris pumila* are placed in boxes 12-15 cm. high; if planted too deep they rot. These boxes are set in frames free from frost and early in February they are placed in a hothouse, close under the glass. They flower March-May.—*J. C. Th. Uphof.*

1902. DYKES, W. R. **Iris conference.** Gard. Chron. 71: 325-326. 1922.—Held at Vincent Square, London, June 7 and 8, the conference brought together the best collectors of garden varieties of bearded Irises ever shown in the Hall. Extended notes on exhibits and exhibitors are given.—*P. L. Ricker.*

1903. GRIMM, KARL. **Mehr Cyclamen-Blumen zum Pflücken im Winter.** [More cyclamen flowers in winter.] Möllers Deutsch. Gärtnerzeitg. 37: 205-206. 2 fig. 1922.—The author emphasizes the fact that cyclamen should be grown in winter for the cut-flower industry. The newer varieties especially develop colors valuable for bouquets. Only the finest and largest flowers should be grown.—*J. C. Th. Uphof.*

1904. JACOB, JOSEPH. **Select bulbs for 1922.** Gard. Chron. 72: 150. 1922.—Notes are given on tests of recent varieties.—*P. L. Ricker.*

1905. JUNGE, HEINRICH. **Aster ericoides "Schneetanne" und Aster vimineus "Erlkönig."** Möllers Deutsch. Gärtnerzeitg. 37: 209. 1 fig. 1922.—The small flowering herbaceous *Aster ericoides* Schneetanne and *A. vimineus* are recommended as the best of this type. They flower from September until the middle of October.—*J. C. Th. Uphof.*

1906. O'B., J. **Yellow Dendrobiums.** Gard. Chron. 72: 125. Fig. 52. 1922.—Distribution of yellow species in nature, their hybridization, and the varieties are discussed.—*P. L. Ricker.*

1907. PROSCHOWSKY, A. ROBERTSON. **Palms of the Riviera.** Gard. Chron. 71: 317. 1922.—The genus *Livistona* is well known to gardeners, but not sufficiently planted on the Riviera. *L. chinensis* was until recently the most cultivated palm in the market, but now is being replaced by *Howea forsteriana*. The former are more graceful fan palms with more beautifully shaped leaves than those covered in previous article. Some are of remarkable size, ranging up to 8-10 m. in height, but are very slow growing.—*P. L. Ricker.*

1908. PROSCHOWSKY, A. ROBERTSON. **Palms of the Riviera.** Gard. Chron. 72: 66. Fig. 28. 1922.—*Livistona australis* is figured and compared with related palms on the Riviera.—*P. L. Ricker.*

1909. TREVITHICK, W. E. **Metamorphosis of Rhododendron inflorescence.** Gard. Chron. 72: 123. Fig. 50. 1922.—A form resembling some double forms of *Camellia* found at Kew on *R. corona* is figured and described.—P. L. Ricker.

VEGETABLE CULTURE

1910. BEATTIE, W. R. **Peat soils in vegetable production.** Jour. Amer. Peat Soc. 15: 28-32. 1922.—These soils are valuable for the production of lettuce, celery, and onions, and the possibilities with other crops have scarcely been touched upon.—G. B. Rigg.

1911. GLEISBERG, W. **Gemüsesorten und Pflanzenzüchtung.** [Vegetable varieties and plant breeding.] Gartenwelt 26: 370-372. 1922.—Varieties of vegetables should be examined as to their purity, for a great number of commercial varieties belong to "a population" instead of to a pure line. In 17 seed catalogues there were too many varieties of the same type. Of white cabbage there were 26 varieties which are early and round, 10, early and pointed 25, late and round, and 6, late and pointed.—J. C. Th. Uphof.

1912. SCHMIDT, J. C. **Buschbohne Wachs Schlossperle.** [Dwarf bean "Wachs Schlossperle."] Möllers Deutsch. Gärtnerzeitg. 37: 213. 2 fig. 1922.—This is an account of a white bean, produced from a colored variety. It has a fine flavour, is very productive, and is 10-12 days earlier than Wachs (wax) Flageolet.—J. C. Th. Uphof.

HORTICULTURE PRODUCTS

1913. ALLEN, W. J., and J. M. ARTHUR. **Some experiments in drying apricots.** Agric. Gaz. New South Wales 33: 738. 1922.—The methods used are described and tabulated.—L. R. Waldron.

1914. CHACE, E. M. **By-products from citrus fruits.** U. S. Dept. Agric. Dept. Circ. 232. 13 p. 1922.

1915. DEUSS, J. J. B. **Eenvoudige oven om kleine hoeveelheden thee af te drogen.** [Simple oven for drying small quantities of tea.] De Thee 1: 79-80. 1 fig. 1920.—An oven successfully used on a small plantation in Java is described and diagrammed.—Carl Hartley.

1916. DEUSS, J. J. B. **Over coffeine bereiding uit theeblad en thee.** [Concerning the preparation of caffeine from tea leaf and tea.] De Thee 2: 62-63. 1921.—The 1st and 2nd leaves contain 4.3 per cent, and the 5th and 6th, 1.5 per cent, of caffeine. Tea prunings yielded 2.3 per cent, and the "fluff" from the leaves 2.25 per cent.—Carl Hartley.

1917. DEUSS, J. J. B. **Resultaten van de enquête over het drogen. I.** [Results of the questionnaire on drying. I.] De Thee 1: 112-117. 1920.—Data are given on the performance of various makes of tea-drying machines obtained by a questionnaire addressed to Java tea growers.—Carl Hartley.

1918. DEUSS, J. J. B. **Resultaten van de enquête over het drogen. II.** [Results of investigation of drying. II.] De Thee 2: 16-19. 1921.—A comparison of 2 drying installations for tea is made.—Carl Hartley.

1919. DEUSS, J. J. B. **Verpakking van thee in vetpapier in plaats van lood.** [Packing tea in oiled paper instead of lead.] De Thee 1: 119-120. 1920.—Oiled paper is used for small packages of tea in Holland, but cannot be employed in the moist atmosphere of West Java, even in retail trade, the tea so packed becoming thoroughly moulded in 2 months. Packing in paraffin paper and so-called parchment paper also failed. For some reason, even tea kept in glass-stoppered jars or sealed glass tubes moulds more quickly than tea kept in lead containers which have been closed merely by folding. Perhaps too tight closure is undesirable.—Carl Hartley.

1920. HEIDE, VON DER. Neuere Erfahrungen auf dem Gebiete der Weinbehandlung insbesondere der Obstweine. [New experiences in handling wine, especially fruit wine.] Mitteil. Deutsch. Landw. Ges. 37: 687-692. 1922.—In this address the author spoke at length on some of the factors influencing wine making. The following subjects were discussed: pure yeasts; acidity changes; artificial decrease and increase in acidity; the absorption of acid from burning sulphur; filtering and purifying; the addition of water and sugar.—A. J. Pieters.

1921. HILTS, R. W. Report on the determination of moisture in dried fruits. Jour. Assoc. Official Agric. Chem. 6: 40-48. 1922.—Results of moisture determinations on peaches, pears, and apricots, using vacuum and water-oven methods, are reported.—F. M. Schertz.

1922. KNAUTH, ANDREAS. Obstsorten für die Dauerwarenherstellung. [Fruit varieties for preserving.] Gartenwelt 26: 369-370. 1922.—This is a general account from Germany of various varieties of fruits suitable for preserves, cider, etc.—J. C. Th. Uphof.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See in this issue Entries 1824, 1838, 1909, 2016, 2048, 2056, 2066, 2085, 2218)

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 1947, 2066)

1923. BATTEN, L. Organs of attachment in Polysiphonia. [Abstract.] Rept. Brit. Assoc. Adv. Sci. 1921: 452. 1921.

1924. BRUCK, ERWIN. Experimentelle Untersuchungen an den Schwärmern von Chromulina Rosanoffii (Bütschli). [Experimental studies of the swarm spores of Chromulina Rosanoffii.] 8 vo, 49 p. Diss. Breslau, 1921.

1925. DVOŘÁK, R. Sur la recherche des algues en Moravie. [On the study of algae in Moravia.] Nuova Notarisia 33: 135-138. 1922.—A brief review is presented of the results of studies of the algae of Moravia and Bohemia, especially by Nave, Richter, Dvořák, Prát, and Fischer, and with dates of publication ranging from 1863 to 1920.—Marshall A. Howe.

1926. FUNK, GEORG. Über einige Ceramiaceen aus dem golf von Neapel. [Some Ceramiaceae from the Gulf of Naples.] Beih. Bot. Centralbl. II Abt. 39: 223-247. Pl. 5. 1922.—Habitats and associated plants are given and a summary of the Ceramiaceae found in the Gulf of Naples is added. *Vickersia canariensis* Karsakoff var. *mediterranea* is described as new. *Dohrniella* is proposed as a new genus, with *D. neapolitana* a new species. *Ceramium Bertholdi* and *Callithamnion Aegagropilae* are new species.—L. Pace.

1927. HUFF, N. L. Copper sulphate for preventing algal growths in lakes and reservoirs. Engineering and Contracting 58: 33-36. 1922.—The copper sulphate method of control or destruction of algal growths is described under the method of application, the amount required, and the effect of the chemical on fish life.—H. H. Wagenhals.

1928. MAMELI, EVA. Sulla costituzione chimica della membrana delle alghe Cianoficee. [On the chemical constitution of the membrane of the Cyanophyceae.] Atti Ist. Bot. Univ. Pavia 17: 257-264. 1920.—The chemical constitution of the membrane of the Cyanophyceae has been known for only a small number of genera and with some lack of uniformity in results; there has been in particular some uncertainty as to whether cellulose is present in all. The

present research is based upon 34 genera, represented by about 100 species, including a few lichen-forming species, which give the following conclusions: (1) cellulose is present in general in the membranes of all the Cyanophyceae, a result that harmonizes the chemical behavior of the dermatoplasm of these algae with that of the vegetal cell in general; (2) the cellulose is usually accompanied by a pectic substance; (3) the search for chitin gave negative results; (4) the products of hydrolysis of the cellulose of the Cyanophyceae thus far met with are pentosans and galactans. The membrane of the Cyanophyceae is then, in general, of a pectic-cellulose nature.—*Marshall A. Howe.*

1929. MAZZA, ANGELO. Aggiunte al saggio di algologia oceanica. [Appendix to the essay on oceanic algology.] *Nuova Notarisia* 33: 1-31, 97-125. 1922.—The author continues his systematic and morphological studies of the Florideae of the world. The species particularly described and discussed are *Leptocladia Binghamiae*, *L. conferta*, *Nitophyllum Curdieanum*, *N. Durvillei*, *Botryoglossum violaceum*, *B. Ruprechtianum*, *Phytomorpha imbricata*, *Schizoneura Davisii*, *Ptilonia magellanica*, *Bonnemaisonia hamifera*, *Ricardia Montagnei*, *Laurencia perforata*, *L. spectabilis*, *Coeloclonium opuntioides*, *Chondria foliifera*, *C. debilis*, and *C. crassicaulis*.—*Marshall A. Howe.*

1930. SETCHELL, WILLIAM ALBERT, and NATHANIEL LYON GARDNER. Phycological contributions. II to VI. *Univ. California Publ. Bot.* 7: 333-426. *Pl.* 32-49. 1922.—The "contributions" and their contents of novelties are as follows:—II. New species and new forms of *Myrionema*: *M. primarium*; *M. primarium* f. *acuminatum*; *M. minutissimum*; *M. foecundum* f. *simplicissimum*, *subulatum*, *ramulosum*, *divergens*, and *majus*; *M. coronae* f. *uniforme*, *angulatum* and *sterile*; *M. balticum* f. *pedicellatum* and *californicum*; *M. globosum* f. *affine*; *M. compsonematoides*; *M. hecatonematoides*; *M. attenuatum*; *M. attenuatum* f. *doliiforme*; *M. phyllophilum*; *M. setiferum*; *M. obscurum*.—III. New species and new forms in *Compsonema*: *C. streblonematoides*, *C. intricatum*, *C. fructuosum*, *C. pusillum*, *C. speciosum* f. *piliferum*, *C. sporangiiferum*, *C. sessile*, *C. tenue*, *C. nummuloides*, *C. fasciculatum*, *C. myrionematoides*, *C. secundum*, *C. ramulosum*, *C. serpens*, *C. coniferum*, *C. dubium*, *C. secundum* f. *terminale*.—IV. New species of *Hecatonema*; *H. variabile*, *H. clavatum*, *H. Lawsonii*.—V. New species of *Pylaiella* and *Streblonema*: *Pylaiella tenella*, *P. unilateralis*, *Streblonema Porphyrae*, *S. myrionematoides*, *S. penetrans*, *S. vorax*, *S. scabiosum*, *S. evagatum*, *S. rugosum*, *S. transfixum*, *S. corymbiferum*, *S. anomalum*, *S. Johnstonae*. *S. aecidioides* f. *pacificum* appears as a new form, and *S. investiens* (Collins) as a new combination.—VI. New species of *Ectocarpus*: *E. affinis*, *E. chantransioides*, *E. commensalis*, *E. eramosus*, *E. flagelliferus*, *E. flocculiformis*, *E. fructuosus*, *E. granuloides*, *E. Mesogloiae*, *E. Saundersii*, *E. simulans*, *E. socialis*, *E. Taoniae*. Further are to be noted: *Ectocarpales* nom. nov.; *Ectocarpus acutus* nom. nov.; *E. confervoides* f. *parvus* (Saunders) comb. nov.; *E. cylindricus* f. *typicus* nom. nov.; *E. cylindricus* f. *codiophilus* f. nov.; *E. cylindricus* f. *acmaeophilus* f. nov.; *E. siliculosus* f. *subulatus* (Kuetz.) comb. nov.—*W. A. Setchell.*

1931. SHAW, W. R. *Copelandosphaera*, a new genus of the Volvocaceae. *Philippine Jour. Sci.* 21: 207-232. *Pl.* 1-4. 1922.—A new species is made the type of a new genus under the name *Copelandosphaera dissipatrix*. It differs from *Volvox* and *Janetosphaera* in having no protoplasmic connections between the cells, and also in having the gonidia differentiated from the somatogenic cells before the last cell divisions in the growth of the coenobium. It differs from *Campbellosphaera* and *Merrillosphaera* in having the gonidia differentiated late in the embryonic development. It is unlike *Campbellosphaera* in not having its gonidia marginal and migratory, and is unlike *Merrillosphaera* in not having regular numbers of gonidia with geometrically symmetrical arrangement. Bisexual individuals produce many oogonidia and a few androgonidia that are of about the same size. An American species (*V. spermatosphaera*) is included in this new genus.—*E. D. Merrill.*

1932. SKOTTSBERG, CARL. Notes on Pacific Coast algae, II. On the Californian "*Delesseria quercifolia*." *Univ. California Publ. Bot.* 7: 427-436. *Pl.* 50. 1922.—The author

shows that the red alga of the Pacific Coast of North America which has generally passed under the name of *Delesseria quercifolia* Bory is not of that species. He names it *Phycodrys Setchellii* sp. nov.—W. A. Setchell.

1933. SKVORTZOW, B. W. Notes on the agriculture, botany, and zoology of China. Jour. Roy. Asiatic Soc. North China Branch 53: 189-195. 1922.—The author includes a list of 21 fresh-water algae from Fukien; no new names appear.—E. D. Merrill.

1934. STRØM, K. MÜNSTER. Some algae from Merano. Nuova Notarisia 33: 126-134. Fig. 1-2. 1922.—An annotated list is given of 43 species of freshwater algae, collected in the autumn of 1921 in the vicinity of Merano, in what is now the Italian Tirol, mostly at an elevation of 5,500-5,720 feet. *Cosmarium Majae* sp. nov. is described and figured.—Marshall A. Howe.

1935. TEREG, ELINOR. Einige neue Grünalgen. [Some new green algae.] Beih. Bot. Centralbl. II Abt. 39: 179-195. Pl. 1-2. 1922.—The cultural methods used are given. The following species are described as new: *Stenoplana Bertholdi*, *Bracteacoccus aggregatus*, *Chlorococcus intumescens*, *Tetracoccus cartilagineus*, *Chlorosarcina cumuliformis*.—L. Pace.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 1972, 2066)

1936. AMANN, J. Le *Bryum Schleicheri* Schwaegr. Rev. Bryologique 49: 25-28. 1922.—According to the descriptions of Limpricht and Roth, *Bryum Schleicheri* Schwaegr. is distinguished from the closely related *B. turbinatum* (Hedw.) Schwaegr. by its long-decurrent leaves. The author shows that this difference was based on a misconception and that the leaves in both species are slightly or not at all decurrent. He separates the species by means of other anatomical differences in the leaves and calls attention to 2 exotic relatives of *B. Schleicheri*—one from Chile and the other from India.—A. W. Evans.

1937. DOUIN, R. Le sporophyte des Marchantiées. [The sporophyte of the Marchantieae.] Rev. Gén. Bot. 34: 321-335. Pl. 12-13, 4 fig. 1922.—It is shown that the sporophytes of the Marchantieae are fully as diverse as those of the Jungermanniales. Throughout the group a differentiation into foot, seta, and capsule is everywhere apparent, and the author first discusses these parts in detail, laying especial emphasis on the structure of the capsule-wall and the various methods of dehiscence. He then describes the parts that protect the sporophyte during its development and points out their importance from the standpoint of classification. These parts include the calyptra, the involucre, and the perianth, the last being present in only 4 genera.—J. C. Gilman.

1938. HUSNOT, T. Hepaticologia Gallica. Flore analytique et descriptive des Hépatiques de France et des contrées voisines. [Gallic hepaticology. Analytic and descriptive flora of the Hepaticae of France and neighboring countries.] 2nd ed., 163 p., 23 pl., Cahan par Athis (Orne), France, 1920.—The 1st edition of this manual on French Hepaticae was published in 1881 and included 45 genera and 174 species; the 2nd edition, which is essentially a new work, includes 80 genera and 289 species. In a short introduction the general morphology of the Hepaticae is described, and directions are given for collecting and studying specimens. The work then proceeds to the description of the species, genera, and larger groups represented, artificial keys being provided wherever necessary. The Hepaticae are first divided into the 3 grand divisions Jongermanniaceés, Marchantiaceés, and Anthocérotoceés; and the Jongermanniaceés are subdivided into the Acrogynes and the Anacrogynes. The Acrogynes are then subdivided into the following tribes: Jubulées (5 genera and 23 species), Madothecées (1 genus and 6 species), Pleuroziées (1 genus and 1 species), Radulées (1 genus and 6 species), Scapaniées (2 genera and 24 species), Blepharoziciées (7 genera and 9 species), Cephaloziciées

(11 genera and 52 species), and Lophoziaées (23 genera and 101 species). The Anacrogynes yield the tribes Haplomitriées (1 genus and 1 species), Fossombroniées (4 genera and 11 species), Dilénées (2 genera and 4 species), Metzgeriées (2 genera and 10 species), Riellées (1 genus and 2 species) and Sphérocarpées (1 genus and 2 species); while the Marchantiacées are directly divided into the tribes Marchantiées (13 genera and 19 species), Targioniées (1 genus and 1 species), Corsiniées (1 genus and 1 species), and Ricciées (2 genera and 10 species). The Anthocérotaées, which are not subdivided into tribes, include 2 genera and 6 species. As a rule the species are understood in a broad sense, so that some of the so-called "small" species described during recent years are either totally ignored or reduced to varietal rank. Under each species data are given regarding the local distribution within the region studied and also the general distribution, in the case of species extending beyond this region. The plates comprise about 1,800 separate figures. These represent the species described in natural size and also with enlarged details.—A. W. Evans.

1939. H[USNOT], T. [Rev. of: DAVY DE VIRVILLE, AD., et ROBERT DOUIN. Sur les modifications de la forme et de la structure des hépatiques maintenues submergées dans l'eau. (Concerning the modifications of form and structure of hepatics brought about by maintaining them under water.) Compt. Rend. Acad. Sci. Paris 172: 1306-1308. 1921 (see Bot. Absts. 10, Entry 603).] Rev. Bryologique 49: 32. 1922.—The reviewer (in a footnote) calls attention to the various forms assumed by *Hypnum cupressiforme* under different environmental conditions and intimates that such forms, in the case of a less common moss, would be treated as distinct species, to the detriment of science.—A. W. Evans.

1940. LOESKE, L. Adventive Moose bei Berlin. [Adventive mosses in the vicinity of Berlin.] Bryol. Zeitschr. 1: 138, 140. 1918.—Attention is called to a series of mosses apparently introduced into the Berlin flora. Some of these were found on boulders in the Botanical Garden at Dahlem and the others on oak logs from Bohemia piled up at Strausberg. Of the species listed from Dahlem the following are otherwise unknown in the district under consideration: *Anomodon attenuatus*, *Barbula reflexa*, *Brachythecium laetum*, and *Grimmia Hartmanni*. Of the Strausberg species *Antitrichia curtipendula* and *Leskea nervosa* are the most interesting, the *Leskea* being new to the region.—A. W. Evans.

1941. L[OESKE], L. Zur Bryogeographie Mitteleuropas. [On the bryogeography of Central Europe.] Bryol. Zeitschr. 1: 142-144. 1918.—The author gives notes on the distribution of 14 mosses in Central Europe. Among the more interesting of these are the following: *Barbula flavipes*, new to Thuringia; *Catoscopium nigrum*, new to East Prussia; *Dichelyma capillaceum*, new to western Europe; *Mnium cinclidioides*, new to the March of Brandenburg; *Orthothecium intricatum*, new to the Harz Mountains; and *Plagiobryum Zierli*, new to the Black Forest.—A. W. Evans.

1942. MAHEU, JACQUES. Sur une tardive régénération de mousse. [On a delayed regeneration in a moss.] Compt. Rend. Acad. Sci. Paris 174: 1124-1126. 10 fig. 1922.—The author describes the regeneration of *Barbula muralis* Hedw. in material that had been kept dry for 14 years. When placed in a humid atmosphere some of the leaf cells gave rise to short filaments each of which bore a rounded unicellular gemma at the tip. Upon becoming detached this developed into a typical moss protonema upon which a lateral bulblet was produced, this bulblet growing directly into a diminutive leafy shoot. The various steps in the process are figured.—C. H. Farr.

1943. MOENKEMEYER, W. Ueber *Hypnum turgescens* und *trifarium*. [On *Hypnum turgescens* and *H. trifarium*.] Bryol. Zeitschr. 1: 140, 141. 1918.—The author expresses the opinion that *Hypnum turgescens* T. Jens. is not closely related to *H. trifarium* and *H. stramineum*, as certain authors have stated or implied. He thinks that these 2 species are clearly referable to the genus *Calliargon*, while *H. turgescens* is so closely related to *H. scorpioides* L., a member of the genus *Scorpidium*, that he reduces it to varietal rank, giving it the name *Scorpidium scorpioides* var. *turgescens* (T. Jens.) Moenkemeyer. In connection with *Calliargon stramineum* he describes a new var. *patens*, basing it on various European specimens.—A. W. Evans.

1944. PAUL, H. Ueber *Hypnum turgescens* T. Jensen, eine systematisch-geographische Studie. [On *Hypnum turgescens*, a systematic-geographic study.] *Bryol. Zeitschr.* 1: 145-160. 8 fig. 1918.—In this paper, which is not yet completed, the author discusses the relationships of *H. turgescens* to other hypnoid mosses and gives an account of its geographical distribution and vegetative reproduction. After summarizing the involved synonymy of the species he reaches the conclusion that it is distinct from *H. scorpioides* L., to which Moenkemeyer had reduced it as a variety [see previous entry]. He refers both species to the genus *Scorpidium* of which he gives a revised description, laying especial emphasis on the variability of the leaf-nerves, on the poorly defined alar cells, on the concavity of the leaves, and on the absence of rhizoid-initials among the leaf-cells. As thus amended the genus includes the following 4 species, 2 of which represent new combinations: *S. lycopodioides* (Brid.), *S. scorpioides* (L.) Limpr., *S. turgescens* (T. Jens.) Loeske, and *S. trifarium* (Web. & Mohr.). In addition to these the following new combinations, based on northern species, are tentatively proposed: *S. brevifolium* (Lindb.), *S. latifolium* (Lindb.), and *S. longicuspis* (Lindb. & Arnell). From the genus *Scorpidium* the author excludes the northern *H. badium* Hartm. in spite of its forked leaf-nerves, making it the type of the new genus *Loeskypnum* and giving it the name *L. badium* (Hartm.). The European distribution of *Scorpidium turgescens* includes 2 distinct areas, an arctic area extending as far south as Esthonia and Livonia and an alpine area in the mountains of Central Europe. The organs of vegetative reproduction are deciduous apical buds; these break away and renew their growth directly or else give rise to lateral shoots.—A. W. Evans.

1945. PÉTERFI, MARTIN. O formă teratologică la *Catharinaea Haussknechtii* (Jur. et Milde) Broth. [A teratological form of *Catharinaea Haussknechtii*.] *Bull. Soc. Stiințe Cluj* 1: 149-153. 1 fig. 1921.—A teratological form of *Catharinaea Haussknechtii* is described in which the wall of the archegonium, after fertilization, does not show the usual differentiation into vaginule and calyptra but forms merely an elongated tube enclosing the lower half of the seta. At the upper end vestiges of the neck are often to be seen, showing that the tube has actually arisen from the whole of the ventral wall. In this case the archegonium of a moss resembles that of a liverwort in its later development. In connection with the abnormality just described other teratological features make their appearance, the various organs of the sporogonium (for example) failing to attain their usual size. The author designates the abnormality in the archegonium as "archegonio-solenoidie" and states that no similar case has been described in the literature. In his opinion it yields an additional point of evidence that the Hepaticae form an older group than the Musci.—M. Tiesenhausen.

1946. POTIER DE LA VARDE, R. Récoltes bryologiques en Asie Orientale. [Bryological collections in eastern Asia.] *Rev. Bryologique* 49: 28-31. 1 pl. 1922.—The author gives a list of 11 species of mosses collected in 1914 by V. Demange in Tonkin and China, a definite station being given for each species. *Campylopus Demangei* Thér. et P. de la V. from Tonkin and *Entodon punctulatus* Thér. et P. de la V. from China are proposed as new and illustrated, while *Timmiella multiflora* C. M. is reduced to synonymy under *T. rosulata* C. M. The original description of *Pseudo-Leskea Larminatii* Broth. et Par., a rare species of Tonkin, is corrected and supplemented by an account of the capsule.—A. W. Evans.

1947. QUELLE, FERDINAND. Die Organismen-Spezies als Kurve, an den Moosen dargestellt. [The organism-species as a curve, illustrated by the mosses.] *Bryol. Zeitschr.* 1: 115-137. 27 fig. 1918.—The author brings out the fact that the genus-concept in the organic world is something more or less artificial and that the boundaries of a genus are based on arbitrary distinctions. He emphasizes his point by quotations from Limpricht, in which the vague and uncertain differences between many moss genera are brought out. In order to illustrate the relationships of a species to other species he attempts to represent it graphically by a curve, based on definite characters not subject to a personal equation in their interpretation. He demonstrates his method by means of 25 species of hepatics and mosses and 83 bryophytic characters arranged in a definite series. The first 5 characters, which will

give an idea of the others, are the following: (1) the egg to be fertilized arises in an archeogonium on the moss plant and develops into the sporogonium after fertilization; (2) the green pigment is in chlorophyll-plates with pyrenoids; (3) the green pigment is in chlorophyll grains; (4) special cells with oil-bodies are present; (5) all the green cells contain oil-bodies. Taking the characters of the various species into consideration and using a peculiar method of plotting the author is able to construct a distinctive curve for each species, and these curves are represented by the text figures. In an appendix to the paper theoretical discussions are given on alternation of generations in the mosses and on the significance of the peristome.—A. W. Evans.

1948. THÉRIOT, I. *Le problème du Leucobryum candidum*. [The problem of *Leucobryum candidum*.] Bull. Soc. Bot. Genève 13: 217-225. 3 fig. 1921.—According to Paris and Jaeger *Leucobryum brachyphyllum* (Hornsch.) Hpe. is a synonym of *L. candidum* (Brid.) Jaeger, the latter species being based on *Dicranum candidum* Brid. The author first presents evidence to show that *D. candidum* Brid. is antedated by a few months by *D. candidum* Schwaegr., although both date from 1826, and concludes that the species should therefore be called *Leucobryum candidum* (Schwaegr.) Jaeger. He then shows that *L. brachyphyllum* is amply distinct from *L. candidum* and brings out the differential characters separating the 2 species by means of figures and revised descriptions. At the conclusion of his paper he figures and proposes as new another ally of *L. candidum* under the name *L. confusum*. *L. brachyphyllum* and *L. candidum* are apparently confined to Australia and Tasmania, while *L. confusum* is known from Tasmania, New Zealand and New Caledonia.—A. W. Evans.

1949. THÉRIOT, I. *A propos du Leucobryum candidum*. [Regarding *Leucobryum candidum*.] Rev. Bryologique 49: 31, 32. 1922.—The author corrects a statement made in an earlier paper on *Leucobryum candidum* (see preceding entry). He now shows that the name *Dicranum candidum* Brid. dates from 1798, instead of from 1826, and that the citation *L. candidum* (Brid.) Jaeger is therefore correct.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 1641, 1649, 1668, 1884, 2021, 2023, 2025-2032, 2035, 2037-2042 2073, 2106, 2107, 2120, 2123, 2128, 2129, 2142)

FUNGI

1950. ANONYMOUS. *Pathological herbarium notes* 5. 7 p. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections: Washington, D. C. 1922.—Accessions for period, April 1-November 1, 1922, include 2,386 specimens. Lists of exsiccati and special collections received are listed, and noteworthy species represented in recent accessions are named.—H. M. Fitzpatrick.

1951. ANDERSON, J. P. *Some Alaska fungi*. Proc. Iowa Acad. Sci. 27: 99-108. 1920.—A list is given of 133 species of parasitic and saprophytic fungi, from *Plasmodiophora* and the bacteria to Fungi Imperfecti. Determinations were made mostly by the U. S. Department of Agriculture at Washington. Host plants (137) are listed alphabetically; the fungi are systematically arranged, with notes on frequency and habitat.—H. S. Conard.

1952. BARTHOLOMEW, ELAM. *Edible mushrooms of Kansas*. Trans. Kansas Acad. Sci. 30: 174-179. 1919/21 [1922].—A popular account is presented of a few species in Kansas, with a plea for greater utilization.—F. C. Gates.

1953. BONAR, LEE. *The life history of Rosellinia Caryae sp. nov. causing a hickory canker and disease*. Phytopathology 12: 381-385. Fig. 1-3. 1922.—A canker of the twigs and

trunks of young trees of *Carya ovata* (Mill.) Koch. not previously reported has been observed near Ann Arbor, Michigan. The cankers are dead sunken areas, varying from small spots less than 1 inch long to areas 3 inches broad and 6 inches long. On twigs the cankers are usually formed about the leaf scar, but sometimes involve the entire twig. In a few cases young trees, 2-3 inches thick, were killed to the ground. On young twigs the cankers invariably showed numerous fungous pycnidia breaking through the dead bark. Some of the cankered twigs, after being washed in mercuric chloride solution, were placed in test tubes containing a little sterile water. After 6 months perithecia with mature ascospores were quite abundant. Cultures from the ascospores and from the pycnosporos produced pycnidia of the same type.—*B. B. Higgins.*

1954. BOSE, S. R. One new species of Polyporaceae and some polypores new to Bengal. *Ann. Mycol.* 19: 129-131. *Pl.* 1-3. 1921.—*Fomes rufalaccatus* is described as new from Junjub, India. *Polyporus inzonensis* Murrill, *Fomes durissimus* Lloyd, and *Trametes fuscella* Lévillé are reported from Calcutta and Bengal.—*H. S. Jackson.*

1955. BUCHNER, P. Zur Kenntniss der Symbiose niederer pflanzlicher Organismen mit Pediculiden. [Symbiotic relations between lower plant organisms and the Pediculidae.] *Biol. Centralbl.* 39: 535-540. 1919.—The author presents results of investigations conducted contemporaneously with, but independent of, Sikora [see Bot. Absts. 12, Entry 1983] in which he shows that the abdominal organ (Magenscheibe) of certain Pediculidae is a mycelium-harboring body homologous with the mycetocyte of Coccids and with similarly functioning structures in other insects [Blattidae, Hymenoptera (*Camponotus*, *Formica*), and certain Coleoptera]. In all these cases a symbiotic relation exists between the insect and fungus mycelium. The author cites Sikora's priority in the announcement of the true nature of these organs (in head lice and others, the Magenscheibe), but has carried researches further in showing manner in which the eggs of the insect become infected with the fungus. A fuller presentation of results is promised.—*William L. Bray.*

1956. DIETEL, P. Kleine Beiträge zur Systematik der Uredineen. [Minor contributions to the taxonomy of Uredinales.] *Ann. Mycol.* 20: 29-33. 1922.—The author calls attention to the catenulate urediniospores of *Melampsora Hypericorum* (DC.) Wint. and the absence of associated pycnia. The species is thought to be heteroecious and is considered to represent an intermediate form between *Coleosporium* and *Melampsora*. *Mesospora* is proposed as a new genus with this species as the type.—*Tranzschelia* Arth. is accepted as a valid genus on morphological grounds, but the author takes exception to *Lipospora* Arth. and *Polythelis* Arth., -opsis and micro-forms of similar type, on the ground that to accept genera on a life history basis results in placing in different genera species which are obviously closely related. *Tranzschelia Pruni-spinosae* (Pers.) is proposed as a new combination to replace *T. punctatum* (Pers.) Arth. *Lipospora tucsonensis*, *Polythelis fusca*, *P. Pulsatillae* and *P. Thalictri* are transferred to *Tranzschelia*.—The relationship of *Ochropsora* is discussed. Biological evidence is presented which indicates a relationship between *Ochropsora* and *Tranzschelia*. The latter is considered to belong to the sub-family Phragmidatae and it is suggested that the 2 genera may have arisen from a closely related form but show divergent development, especially in the telial stage.—*H. S. Jackson.*

1957. ESSIG, FREDERICK MONROE. The morphology, development, and economic aspects of *Schizophyllum commune* Fries. *Univ. California Publ. Bot.* 7: 447-498. *Pl.* 51-61. 1922.—In summarizing the morphology and development of *Schizophyllum* it may be said that: (1) The sporophores vary greatly as to form and shape. (2) The segments of the mycelium and sporophores, and spores are regularly binucleate. (3) The fungus develops its sporophores as does no other member of the Hymenomycetes so far studied, the hymenium primordium arising in an apical cavity. (4) The "gills" arise upon the surface of an apical depression due to tensions set up by unequal rates of growth. (5) The "lamellae" are such by analogy only, being the edges of smooth hymenial areas, and therefore *Schizophyllum* belongs in the

family Thelephoraceae.—As regards the economic aspects of *Schizophyllum*, it has been shown that: (a) Members of this genus are found throughout the tropical and temperate zones of the world. (b) They live upon a great number of woody dicots, monocots and gymnosperms. (c) The fungus possesses unusual vitality. (d) The mycelium is found only in small amount in infected wood. (e) It can grow upon fresh wood, and, under very favorable conditions, living wood. (f) Natural infection takes place through some injured or weakened part of the tree. (g) The fungus is usually associated with other parasitic fungi, which probably do most of the damage attributed to *Schizophyllum* but escape attention due to the longer time necessary for them to produce fruit-bodies.—W. A. Setchell.

1958. FONTOYNONT, M., et PAX SALVAT. Lésions mycosiques dues au *Saccharomyces granulatus* observées à Tananarive (Madagascar). Leur guérison par le bleu de méthylène. [Fungous lesions due to *Saccharomyces granulatus* observed at Tananarive, Madagascar. Their cure by means of methylene blue.] Bull. Soc. Path. Exotique 15: 53-59. Pl. I. 1922.—Lesions produced on various parts of the body of a native woman were found to be caused by *Saccharomyces granulatus*. The macroscopic and microscopic details of the organism are not dealt with. The reader is referred to a paper by Vuillemin and Legrain [Arch. Parasitol. 1900] for this information. The authors deal mainly with the symptoms of the disease and its treatment with methylene blue.—G. H. Godfrey.

1959. HEDGCOCK, GEORGE G., and N. REX HUNT. Notes on some species of *Coleosporium*.—II. Mycologia 14: 297-310. Pl. 22-23. 1922.—This is principally a record of inoculation experiments with the following: *Coleosporium Ipomoeae*, *C. ribicola*, and *C. Solidaginis*, the last being considered as made up of 2 distinct forms, one occurring on *Solidago* and the other on *Aster*. Successful infections with aeciospores of *Coleosporium Ipomoeae* were obtained on *Ipomoea caroliniana*, *I. lacunosa*, *I. pandurata*, *Pharbitis barbigera*, *P. hederacea*, and *Quamoclit coccinea*. The aecial stage is now known to occur on 6 species of pine of which *Pinus echinata* is "the most common and susceptible host species." *Coleosporium ribicola* has been successfully inoculated on *Pinus edulis*, *P. pinea*, *Grossularia divaricata*, *G. hirtella*, *G. reclinata*, *G. inermis*, *G. innominata*, *G. missouriensis*, *Ribes americanum*, *R. aureum*, *R. fasciculatum*, *R. inebrians*, *R. nigrum*, *R. odoratum*, and *R. vulgare*. *Coleosporium Solidaginis* has been found occurring naturally on about 60 species of *Solidago* and is now reported on the following new hosts: *S. amplexicaulis*, *S. austrina*, *S. bootii*, *S. brachyphylla*, *S. celtidifolia*, *S. chandonnetii*, *S. Chapmanii*, *S. concinna*, *S. Curtissii*, *S. decumbens*, *S. Drummondii*, *S. erecta*, *S. fistulosa*, *S. glomerata*, *S. hispida*, *S. lancifolia*, *S. odora*, *S. petiolaris*, *S. pinensis*, *S. pinetorum*, *S. pulverulenta*, *S. Purshii*, *S. rigida*, *S. rigidiuscula*, *S. speciosa*, *S. stricta*, *S. tortifolia*, *S. unigulata*, and *S. vaseyii*. The *Coleosporium* occurring on *Aster* "is apparently distinct from *C. Solidaginis*." It is known to occur on at least 60 species and is now reported for the first time on the following: *Aster acuminatus*, *A. concinnus*, *A. corrigiatus*, *A. hirsuticaulis*, *A. junceus*, *A. lowrieanus*, *A. oblongifolius*, *A. patulus*, *A. Pringlei*, *A. schistosus*, *A. spectabilis*, *A. tenuicaulis*, *A. Fremontii*, *A. frondosus*, and *A. viscosum*. The *Solidago* form of *Coleosporium Solidaginis* has been successfully inoculated on *Pinus caribaea*, *P. Coulteri*, *P. echinata*, *P. nigra-austriaca*, *P. radiata*, *P. rigida*, *P. scopulorum*, and *P. taeda*.—H. R. Rosen.

1960. ITO, S. A preliminary report on the Japanese species of *Uromyces*. Ann. Mycol. 20: 81-85. 1922.—A list of 56 Japanese species of *Uromyces* is given with synonymy. Eight species new to the flora of Japan are included. *Uromyces Viciae-unijugae* on *Vicia unijuga* Ait. is described as a new species. *U. mercurialis* P. Henn. on *M. leiocarpa* S. & Z. is redescribed.—H. S. Jackson.

1961. IYENGAR, M. O. PARTHASARATHY, and M. J. NARASIMHAN. A new species of *Schizonella*. Phytopathology 12: 435-438. Fig. 1-4. 1922.—A fungus, which is here described as *Schizonella Colemani* n. sp., was found producing a witches broom on *Vitis quadrangularis* Wall.—B. B. Higgins.

1962. KEISSLER, K. *Mykologische Mitteilungen*. [Mycological contributions.] Ann. Naturhist. Mus. Wien 35: 1-35. 1922.—This is the 1st of a series of papers in which new forms are to be described and critical revisions of known groups given. The 1st part of the article is devoted to new forms as follows: *Pleospora* (?) *Ranunculi* on *Ranunculus Huetii* Boiss.; *Thyrsidium botryosporum* Mont. f. *verrucosa* on the bark of *Aleurites moluccana*; *Brachysporium obovatum* (Berk.) Sacc. var. *Clematidis* on dry branches of *Clematis recta* L.; *Mollisia Potentillae* on dry leaves of *Potentilla argentea*; *Rhabdospora Bornmülleri* on sheaths of *Ranunculus Huetii*. In the 2nd part of the article appear the following new combinations: *Phaeosporella Cassiopes* (Rostr.); *Chaetosphaeria Epochnii* (B. & Br.); *Sphaerulina Porothelia* (B. & C.); *Ascophanus minutissimus* Boud. var. *Coemansii* (Boud.); *Plicaria granulosa* var. *Boudieri* (Cke.); *P. olivacea* (Boud.); *Pustularia vesiculosa* var. *Stevensonii* (Ell.); *Helvella atra* var. *murina* (Boud.); *Ascochyta Fraxini* (Desm.); *A. pterophila* (Fautr.); *A. Ulmi* (West.); *Ascochyta ulmella* (Sacc.); *Phomopsis mahoniaecola* (Pass.); *Phyllosticta mahoniae* (Thuem.); *Coniothyrium Campanulae* (Sacc. & Speg.); *C. discincola* (E. & E.); *C. orbicula* (E. & E.); *Botryodiplodia platanicola* (Sacc.). In the discussion of the above forms the names of the following genera also appear: *Didymosphaeria*, *Melanomma*, *Sphaeria*, *Cantharina*, *Glonium*, *Peziza*, *Aleuria*, *Leptopodia*, *Verpa*, *Diplodia*, *Phoma*, *Hendersonia*, *Hyalothyridium*, *Ovularia*, *Papularia*, *Ramularia*. The following are described as new: *Phyllosticta Spegazziniana*, *Diplodia Berkeleyi*, *Hendersonia dianthicola*, *Acetabula vulgaris* f. *pallens*, *A. vulgaris* f. *Barlae* (Boud.).—A. S. Hitchcock.

1963. KRIEGER, LOUIS C. C. A sketch of the history of mycological illustration (higher fungi). *Mycologia* 14: 311-330. Pl. 24-31. 1922.

1964. KURSANOV, L. *Recherches morphologiques et cytologiques sur les Urédinées*. [Morphological and cytological researches on the Uredineae.] Bull. Soc. Nat. Moscou 31: 1-129. Pl. 1-4. 1917 [1922].—This work represents a modification of a dissertation by the same author (in Russian, 1915). It is abridged in part, chapters 6-9 and the historical review of the literature being omitted. It is augmented by new and recent observations by the author. For example he describes among aecidial forms normally binucleate new forms with uninucleate aecidia, *A. leucospermum* on *Anemone ranunculoides*. The uninucleate spores germinate by germ tubes likewise uninucleate but infection experiments gave negative results. The author also describes the development of the aecidial fructification, little known up to the present, of the *Peridermium* type, *Peridermium Strobi*, and of the *Roestelia* type, *Gymnosporangium juniperinum*. He describes the development of *Puccinia gageae*, *Uredo Pirolae*, etc.—The conclusions arrived at in this work are in general the same as those in the Russian publication, viz.: (1) Among the different types of aecidial fructifications the aecidium is the primitive type and the caecoma, of more primitive structure, is the result of a regressive evolution. (2) The aecidial fructifications and the primary sori of short cycled rusts are homologous. (3) The contemporaneous short cycled rusts are regressive but not primitive. (4) The "sexual process" in the Uredineae is not a fertilization but apogamy. (5) The initial forms for the further evolution of the rusts belong to the type *Endo-Uredinalis* (Barclay-Grove hypothesis) and are similar to but not identical with *Endophyllum*.—S. Satin.

1965. Лебедева, Л. А. [LEBEDIEVA, L. A.]. *Микофенологическія наблюденія въ Паркѣи Оранжерейхъ Главнаго Ботаническаго Сада*. [Mycophenological observations in the park and greenhouses of the Botanical Garden of Petrograd.] *Ботаническіе Матеріалы Института Споровыхъ Растеній Главнаго Ботаническаго Сада Въ петроградѣ* [Notulae Systematicae Inst. Crypt. Hort. Bot. Petropolitani] 1: 62. 1922.—The author has undertaken the work of collecting and studying from the morphological, physiological, and phenological points of view the fungi growing in the Botanical Garden of Petrograd. It is to be expected that the mycological flora of such a garden will show a great variety of forms, considering the great number of imported plants and the special conditions in the greenhouses. Five species are enumerated and several observations concerning them are given. The species *Sphaeropsis suspecta* Vestregren, *Phoma thallina* Sacc., and *Cytospora Corni* West, were found in the open

on branches of *Cornus sanguinea*. *Phoma thallina* [not *thalina* as written by the author] is considered as a parasite producing the same symptoms as *Sphaeropsis suspecta*. *Gloeosporium Cattleyae* Sacc. was found in the greenhouse on leaves of orchids (*Cattleya*, *Laelia*, *Lycaste*); the 2 last-named are new hosts for this species. The development of this fungus ceases during the winter and begins again in the spring. *Gloeosporium elasticae* Cooke has been found in the same greenhouse on *Ficus* sp.—A. Jacewski.

1966. Лебедева, Л. А. [LEBEDIEVA, L. A.] О новых Видѣхъ Грибовъ, Собранныхъ Въ Ставропольской Губ. Въ 1916. Матеріалы по обследованію Микологическому Россіи. [New species of fungi from North Caucasus. 1916. Materials for mycological investigations in Russia.] Vol. V, No. 3. Botanical Garden, Petrograd, 1921.—Twelve parasitic or saprophytic micro-fungi hitherto undescribed are enumerated: (1) *Stigmatea Scabiosae* on leaves of *Scabiosa ucrainica*; (2) *Pleosphaerulina Lini* on leaves and stems of *Linum perenne*; (3) *Pleosphaerulina Euphorbiae* on living leaves of an *Euphorbia*; (4) *Mycosphaerella glycyrrhizae* on dead leaves of *Glycyrrhiza glabra*; (5) *Mycosphaerella Phlomidis* on wintered leaves of *Phlomis pungens* infected with *Septoria Phlomidis* Bond. & Lebedieva, which is very probably its pycnidial stage; (6) *Dothidella Thalictri* on dead leaves of *Thalictrum minus*; (7) *Hendersonia Tragopogonis* on dry stems of *Tragopogon major*; (8) *Hendersonia Zygophylli* on dead leaves of *Zygophyllum Fabago*; (9) *Septoria Cucubali* on living leaves of *Cucubalus baccifer*; (10) *Naemospora Rubi* on dead stems of *Rubus idaeus*. (Very probably this is a synonym of *Cytospora Rubi* Schweinitz on the same host cited in North America, but with a very incomplete description. In Europe there is another *Cytospora* on *Rubus idaeus*, *Cytospora ambiens* Sacc., but with quite different stylospores.) (11) *Ramularia Lini* on living leaves and stems of *Linum perenne*; (12) *Ramularia Lithospermi* on living leaves of *Lithospermum officinale*. For all the species complete Latin diagnoses are given.—A. Jacewski.

1967. LUPO, PATSY. Stroma and formation of perithecia in *Hypoxylon*. Bot. Gaz. 73: 486-495. Pl. 18. 1922.—Material from Ohio of *H. coccineum* was studied. The stroma shows 4 distinct regions. Its firm structure is "gained by many mechanical devices for support, such as tubular extensions from cells, branching and intertwining of hyphae and special articulation surfaces." The hyphae are differentiated into 3 types from the time of their emergence from the substratum; those that form the major part of the stroma, those that form the perithecia and Woronin hyphae, and those that form the superficial layers and probably the conidiophores. The cells of the hyphae are originally binucleate, but may become multinucleate. The formation of the perithecia is initiated by the massing of the hyphae into a circular knot, within the center of which the Woronin hyphae differentiate. The ascogonia develop from the cells of the Woronin hyphae by rounding out, partially separating from each other, and increasing in size. The ascogonia do not drop to the bottom of the perithecium in the older stages but come to lie comparatively closer to the bottom by an expansion of the perithecial wall toward the periphery of the stroma. The nuclear program within the ascogonia is one of few divisions and great increase in size, up to the stage where the ascogonia are well rounded out, and then of rapid division without the maintenance of size. The ascogonium buds out protuberances that are the beginnings of the ascogenous hyphae.—B. W. Wells.

1968. MARTIN, G. W. Morphology and cytology of fungi. [Rev. of: GWYNNE-VAUGHAN, DAME HELEN. Fungi. Ascomycetes, Ustilaginales, Uredinales. xi + 232, 196 fig. Cambridge, 1922 (see Bot. Absts. 11, Entry 4253).] Bot. Gaz. 74: 114-115. 1922.—A few details are criticized by the reviewer. He thinks the author's implication that the phenomenon of 2 nuclear fusions is the normal situation in Ascomycetes is premature. Further, the author's interpretation of clamp connections as structures which have no significance other than to facilitate the passage of food or simply as a vegetative phenomenon is criticized as a statement which will need revision. The reviewer argues against changing the current notion of the basidium in the Uredinales, which the author apparently does when she regards the teleutospore cell as involved in the basidium. A final general commendatory statement is made in which the reviewer states that the author "has performed an invaluable service in

collating this work and presenting it so clearly and concisely. The book is a necessity for the reference shelf of every laboratory where mycology is taught." [See also Bot. Absts. 11, Entry 4247.]-B. W. Wells.

1969. MOREAU, FERNAND. *Le mycélium à boucles chez les Ascomycètes.* [The mycelium with clamp connections in the Ascomycetes.] *Compt. Rend. Acad. Sci. Paris* 174: 1072-1074. 1922.—The occurrence of clamp connections on the sides of hyphae at the transverse walls, which is generally considered to be a characteristic of Basidiomycetes, is now found to exist in the Ascomycetes. The hyphae of *Parmelia Acetabulum*, a lichen, are described in this connection. The clamps are shown to have a direct relation to ascus formation, and to be formed on binucleate cells only. It is suggested that this presents evidence as to the closer relationship of the Ascomycetes and Basidiomycetes.—C. H. Farr.

1970. MURRILL, WILLIAM A. *Index to illustrations of fungi, XXIII-XXXIII.* *Mycologia* 14: 332-334. 1922.—This is an index to the illustrations of higher fungi published by the writer in *Mycologia* since 1916.—H. R. Rosen.

1971. Нагорный, Л. И. N[AGORNY, P. I.] *Материалы Для Головных Кавказа.* [Contribution to the knowledge of the Ustilaginales of the Caucasus.] *Вѣстникъ Тифлискаго Сада Тифлисъ* [Bot. Gard. Tiflis Bull.] 51. 1920.—Dr. Nagorny, for several years chief of the mycological laboratory of the plant disease station at Stavropol in North Caucasus, went during the war to Tiflis as chief of the Caucasian bureau of plant diseases, and pursued there his mycological work, one of the results being here published. He gives an enumeration of 25 smuts of the Caucasus, with indications of their habitat and distribution and with critical remarks; most of the enumerated species are common, but some of them are considered as rare. One of these, *Entyloma Thalictri* Schröter described from Silesia on *Thalictrum minus*, does not seem to be very common throughout Europe, having been found subsequently only in Switzerland by Schellenberg on the same host. In North America the species seems to be rather common, and according to Clinton occurs on different species of *Thalictrum*. In Russia it is reported from different localities in European provinces (Smolensk, Orel, Kursk, Tambov) and also in Siberia (Altai), not only on *T. minus* but also on *T. aquilegifolium*. It has been distributed in 2 Russian exsiccatae (Transchel & Seriebriannikov, *Mycotheca Rossica* No. 255, and Buchholtz, *Herb. of Russian Fungi* No. 615). Nagorny indicates it for the Caucasus on *T. minus* and on *T. sp.* The species is decidedly more widely distributed in western Europe, —another example of the great similarity of the North American and Russian mycological floras that have their connection in Siberia. Nagorny presents a new species, *Tilletia Narduri* on *Nardurus sp.*, collected in 1914 by G. Woronow, in Eriwan. [I may mention that specimens of this species were sent to me by Mr. Woronow, and in examining them I came to the conclusion it was a new species of *Tilletia* and named it *T. Narduri*, but as I was neither able to publish nor to correspond with Woronow, my name became a *nomen nudum*, and Nagorny now has full claim to priority. I would not mention a detail of such small importance but for the fact that Nagorny reports his *Tilletia Narduri* on *Nardurus sp.* In my specimens the label written by Woronow himself mentions *Nardurus persica* as the host plant. In 1914 Mr. Sigri-anski, assistant of botany at Voroneje, found in the province of Voroneje a new *Tilletia* on *Lepturus panonicus* and labelled it *Tilletia Lepturi* Sigr. This species is morphologically very near and perhaps identical with *T. Narduri*.]—A. Jacewski.

1972. ОЛЬ, И. А. [OHL, I. A.] *Новый грибокъ, паразитирующий на коробочкахъ мха* *Polytrichum gracile* Dicks. [A new fungus parasite in the capsules of the moss *Polytrichum gracile*.] *Ботанические Материалы Института Словесныхъ Главнаго Ботаническаго Сада.* [Notulae Systematicae Inst. Crypt. Hort. Bot. Petropolitani] 1: 46. 1922.—A new species of *Stagonospora*, occurring in the capsules of *Polytrichum gracile* collected by W. L. Komarov in the summer of 1913 in South-Oussuri (oriental Siberia) is described. It is very different from the *Stagonospora Ravii* (Ellis) Saccardo, known in North America on *Polytrichum formosum*, the stylospores being $37.5-44.5 \times 6.5-7.5 \mu$ and 5-7 septate. A very thorough description

is given in Russian accompanied by a briefer Latin diagnosis. The species is named *Staganospora Komarowii*.—A. Jacewski.

1973. ОЛЬ, И. А. [OHL, I. A.] *Phyllosticta Semeles* Ohl nov. sp. Новый паразитъ живыхъ листьевъ *Semele androgyna* Kunth. [*Phyllosticta Semeles*, a new parasite on living leaves of *Semele Androgyna* Kunth.] Ботанические Материалы Института Словесныхъ Растений Главнаго Ботаническаго Сада въ Петроградѣ. [Notulae Systematicae Inst. Crypt. Hort. Bot. Petropolitani] 1: 60. 1922.—A description and Latin diagnosis are given of a new species of *Phyllosticta* on living leaves of *Semele androgyna*. Numerous whitish spots limited by a red border and containing many pycnidia are developed on the upper surface of the leaves. The stylospores are ellipsoidal, hyaline, $3.5-5 \times 1.5-2.5 \mu$. The only other fungus known on this host is *Ascochyta Semeles* Saccardo, producing very similar spots and identical pycnidia, but with uniseptate, pale olive, fusiform stylospores measuring $8-9 \times 3 \mu$. Considering the similarity of *Ascochyta Semeles* and *Phyllosticta Semeles* the author is inclined to regard these forms as stages of 1 species, and will continue his observations in order to settle the question.—A. Jacewski.

1974. PATTERSON, FLORA W., W. W. DIEHL, and EDITH K. CASH. A list of fungi (Ustilaginales and Uredinales) prepared for exchange. U. S. Dept. Agric. Dept. Circ. 195. 50 p. 1922.—The list comprises 950 numbers.—L. R. Hesler.

1975. PETERSEN, SEVERIN. Agaricaceer iagttagne i Omegnen of Sorø i Juli Maaned 1918-19-20. [Agaricaceae collected in the vicinity of Sorø during the month of July 1918, 1919, 1920.] Bot. Tidskr. 37: 312-315. 1922.—The month of July offers favorable conditions in the vicinity of Sorø for the development of Agaricaceae. For the 3 years Petersen made daily collections. He lists these as he found them from day to day and later makes a systematic classification.—A. L. Bakke.

1976. PETRAK, F. Beiträge zur Pilzflora von Albanien und Bosnien. [Contribution to the fungus flora of Albania and Bosnia.] Ann. Mycol. 20: 1-28. 1922.—About 225 miscellaneous fungi collected in 1918 by the author are enumerated with occasional notes and descriptions. The following species are described as new: *Diaporthe Psoraleae-bituminosae* on stems of *Psoralea bituminosa*; *Lophodermium iridicolum* on decaying leaves of *Iris* sp.; *Cytospora bosniaca* on twigs of *Rosa* sp.; *Diplodia cynanchina*, *Macrophoma cynanchina*, and *Phomopsis cynanchina* on stems of *Cynanchum acutum*; *Microdiplodia Calamagrostidis* on leaves of *Calamagrostis* sp.; *Phoma albanica* on *Spartium junceum*; *Phyllosticta Inulae-viscosae* on leaves of *Inula viscosa*; *Phyllosticta Staticis* on leaves of *Statice* sp.; *Silerophoma confusa* on twigs of *Buxus sempervirens*; *Septoria albanica* on leaves of *Brachypodium silvaticum*; *Staganospora albanica* on leaves of *Brachypodium silvaticum*; *S. calamagrosticola* on leaves of *Calamagrostis* sp.—H. S. Jackson.

1977. PETRAK, F. Beiträge zur Pilzflora von Mähren und Osterr.—Schlesien. V. [Contribution to the fungus flora of Moravia and Austrian Silesia.] Ann. Mycol. 19: 274-295. 1921.—The article consists of a list, with occasional notes and descriptions, of about 220 fungi, chiefly Uredinales, Ascomycetes, and Fungi Imperfecti. The following species are described as new: *Mycosphaerella eupatoriicola* on stems of *Eupatorium cannabinum*; *Ascochyta lupinicola* on *Lupinus* sp.; *Ascochyta Asparagina* on stems of *Asparagus officinalis*; *A. moravica* on stems of *Centaurea scabiosa*; *Dendrophoma emericola* on twigs of *Coronilla emerus*; *Diplodia Genistae-tinctoriae* on *Genista tinctoria*; *Microdiplodia cornicola* on twigs of *Cornus sanguinea*; *M. evonymella* on *Evonymus europaea*; *M. quercicola* on *Quercus* sp.; *M. Rhamni* on *Rhamnus cathartica*; *M. ribicola* on *Ribes rubrum*; *Phoma Genista-tinctoriae* on *Genista tinctoria*; *P. Ribis-grossulariae* on *Ribes grossularia*; *Rhabdospora hranicensis* on stems of *Leucanthemum vulgare*; *Septoria torilicola* on *Torilis anthriscus*.—H. S. Jackson.

1978. REA, CARLETON. *British Basidiomycetae*. *Demy 8 vo.*, xii + 800 p. Cambridge Univ. Press: London, 1922.—This is a handbook to the larger British fungi, published under the auspices of the British Mycological Society. The work is based chiefly on the system set forth by N. Patouillard in his *Essai Taxonomique sur les Familles et les Genres des Hyménomycètes*, published in 1900.—*D. S. Welch*.

1979. Сатина, Софія. [SATIN, SOPHIE.] *Исторія розвитку перитеція Nectria Peziza (Tode.)* [Development of the perithecia of *Nectria Peziza* (Tode.)] *Журнал Русского Ботанического Общества* [Jour. Russian Bot. Soc.] 2: 30-45. *Fig. A-B, 1-19*. 1917. [Printed in 1919 in Russian with a French résumé].—A spiral, multicellular ascogonium is developed; an antheridium is absent. Division of nuclei in the cells of the ascogonium occurs and mitotic figures are pictured. The writer holds the view of Claussen with reference to a fusion of nuclei in the ascogonium.—*H. M. Fitzpatrick*.

1980. Сатина, Софія. [SATIN, SOPHIE.] *Оплодотвореніє ч історія розвитку Cubonia brachyasca Sacc.* [Fertilization and life-history of *Cubonia brachyasca* Sacc.] *Журнал Русского Ботанического Общества*. [Jour. Russian Bot. Soc.] 4: 77-94. 2 pl. 1918/1919 [1921].—*Cubonia brachyasca* Sacc., a very rare coprophilous fungus belonging to the Ascobolaceae, was found by the author on horse dung sent from Siberia to the Botanical Laboratory of the Women's University of Moscow. *Cubonia* was cultivated on dung agar, and usually numerous apothecia reached maturity on cultures 4-5 days old. The presence of bacteria was necessary for their development. Changing the conditions of light, temperature, and medium had no influence on the fructification. The ascocarp originates from a pair of morphologically distinct sex cells and fertilization takes place. The spirally coiled ascogonium is composed of 3 parts: (a) the 1-celled trichogyne, bent like a hook; (b) the oogonium, easily distinguished by its large dimensions and dense contents; and (c) the several-celled stalk. The many-celled antheridium twists around the ascogonium and its terminal cell fuses with the apex of the trichogyne. After fertilization has taken place these cells become empty and degenerate. The fertilized oogonium enlarges and soon a considerable number of ascogenous hyphae grow out and form asci. The poorly developed peridium is formed from hyphal branches which originate from the cells of the stalk; it does not usually develop before the ascogenous hyphae appear. The process of fertilization and the greater part of the gradual development of the ascocarp can thus be observed in the living state. All the cells of *Cubonia* are multinucleate. There is no evident difference between the male and female nuclei. No fusion occurs in the oogonium, the fusion in the ascus hook being the only one in the life-cycle.—*Sophie Satin*.

1981. Сатина, Софія. [SATIN, SOPHIE.] *Къ історіі розвитку Phacidium repandum*. [The life-history of *Phacidium repandum*.] *Журнал Русского Ботанического Общества*. [Jour. Russian Bot. Soc.] 4: 95-102. 1 pl. 1918/1919 [1921].—The apothecia and pyrenidia of this parasitic fungus develop on living leaves of *Galium rubiginoides*; both appear in early spring but the pyrenidia predominate in the 1st part of summer, the apothecia in the 2nd. They develop independently below the stomata. *Phacidium repandum* is apogamous; there are no male cells. The development progresses as follows: Several vegetative hyphae begin to grow strongly under a stomate and form a stromatic tissue. Soon several ascogonia are differentiated in this more or less well-developed tissue. Each of these consists of a row of coiled cells filled with dense protoplasm. The terminal cells of these ascogonia pass through the stomate; they are considered as functionless trichogynes, 6-8 often passing through a single stomate. The cells of the ascogonium bud and form ascogenous hyphae with asci. Part of the stromatic tissue forms the peridium. The fruit-body increasing in size reaches maturity, ruptures the epidermis of the host plant, and appears on the surface of the leaf. The cytology has not been investigated. The cells of the ascogonium are uninucleate.—*Sophie Satin*.

1982. SCHINZ, HANS. *Der Pilzmarkt der Stadt Zurich der Jahre 1918 und 1919 im Lichte der städtischen Kontrolle*. [The mushroom market of the city of Zurich in the years 1918 and

1919 in the light of city supervision.] Vierteljahrsschr. Naturf. Ges. Zurich 65: 530-544. 1920. The author gives lists of mushrooms offered for sale and the approximate quantities sold of each species. The characters by which wholesome species may be segregated rapidly from poisonous and disagreeable species are briefly considered.—*John H. Schaffner*.

1983. SIKORA, H. Voläufige Mitteilung über Mycetome bei Pediculiden. [Preliminary report upon the occurrence of a mycetome in Pediculidae.] Biol. Centralbl. 39: 287-288. 1919.—The author announces his conclusion that the long recognized "Magenscheibe," or glandlike organ, found in certain Pediculids (head louse, clothes louse, felt louse, and rat louse) is really a fungous filament-harboring organ or mycetome in which at certain stages in the embryonal life of these insects develops an abundance of mycelium of significance in a symbiotic relation. In embryonic stages of the swine louse a homologous organ is also found, which, however, is not seen in the mature louse. The author believes this mycetome to be present in other species of lice and announces early publication of his investigations in full. [See also Bot. Absts. 12, Entry 1955.]—*William L. Bray*.

1984. SYDOW, H. Bemerkungen zu einer Anzahl in letzter Zeit als neu beschriebener Pilze der Philippinen-Inseln. [Observations on some fungi recently described as new from the Philippine Islands.] Ann. Mycol. 20: 66-73. 1922.—Notes are given on 23 recently described fungi, most of which are considered to be identical with previously described forms. A few are redescribed.—*H. S. Jackson*.

1985. SYDOW, H. J. Bornmüller: Plantae Macedoniae. Pilze. [J. Bornmüller: Plants of Macedonia. Fungi.] Ann. Mycol. 19: 243-254. 1921.—A list is given, with occasional notes, of 81 fungi (mostly parasitic) in various groups based on the collections of J. Bornmüller. The following new species are described: *Uromyces Hippocrepidis* on *Hippocrepis ciliata*; *Puccinia Loliana* on *Lolium perenne*; *Coleosporium Asterisci-aquatici* on *Asteriscus aquaticus*; *Aecidium macedonicum* on *Asyneuma limonifolium*.—*H. S. Jackson*.

1986. SYDOW, H. Mycotheca Germanica Fasc. XXIX-XXXVI (No. 1401-1800). Ann. Mycol. 19: 132-144. 1921.—A numerical list is given of the fungi included in the exsiccati. Critical notes are given on 14 of the species included. Descriptions are given for the following new species or varieties: *Mycosphaerella Deutziae* on leaves of *Deutzia Lemonii*; *M. equisetina* on culms of *Equisetum hiemale*; *M. Thelypteridis* on dead fronds of *Aspidium Thelypteris*; *Microthyrium culmigenum* on culms of *Calamagrostis lanceolata*; *Hysterostegiella Typhae* on leaves of *Typha angustifolia*; *Excipula Kriegeriana* on stems of *Sisymbrium strictissimum*; *Helotium herbarum* (Pers.) var *carpogenum*, and *H. stutula* (Pers.) Karst. var. *aesculicarpa* on fruit hulls of *Aesculus Hippocastanum*; *Septoria Glaucis* on leaves of *Glaux maritima*; *Phleospora Ludwigii* on leaves of *Salix repens*; *Oospora marchica* on dead petioles of *Robinia pseudo-acacia*; *Didymaria Matricariae* on leaves and stems of *Matricaria discordea*; *Septoria Matricariae* on leaves of *Matricaria Chamomilla*; *Cercospora Echii* on leaves of *Echium vulgare*. *Stegia Caricis* Pk. is transferred to the genus *Hysteropezizella* and *Leptothyrium asterinum* Berk. & Br. is transferred to *Macrophoma*.—*H. S. Jackson*.

1987. SYDOW, H. Novae fungorum species XVII. [New species of fungi XVII.] Ann. Mycol. 19: 305-309. 1921.—The following new species are described: *Aecidium prolixum* on *Wrightia lanata* from the Philippines; *Meliola guamensis* on *Ochrosia* sp. from Guam; *Nummularia patella* on dead wood from the Philippines; *Cryptosphaeria cubensis* on dead branches of *Acacia Farnesiana* from Cuba; *Didymella Caricis* on dead leaves of *Carex lepidocarpa* from Kurland; *Gibbera aequatoriensis* on leaves of *Cestrum* sp. from Ecuador; *Bombardiastrum javanicum* on dead branches of *Rauwolfia javanica* from Java; *Rosencheldiella Litsea* on leaves of *Litsea glauca* from Japan; *Asterina Balii* on leaves of *Alangium Lamarkii* from India; *A. delicatula* on leaves of *Aegle marmelos* from India; *Phaeociboria brasiliensis* on inflorescence of *Pinus* from Brazil; *Ustilaginoidea borneensis* on heads of *Ischaemum aristatum* from North Borneo. A new genus, *Thyrosema*, of the Microthyriaceae, based on *T. pulchellum* n. sp. on leaves of *Erythroxylon* from Amboina is described and its relationship discussed.—*H. S. Jackson*.

1988. SYDOW, H. The Amboina fungi collected by C. B. Robinson. *Philippine Jour. Sci.* 21: 131-146. 1922.—Seventy species are enumerated, the following being described as new: *Meliola Eugeniae*, *M. amboinensis*, *M. pachychaeta*, *M. Stemonae*, *M. Robinsonii*, *M. megalochaeta*, *M. odontochaeta*, *Diathrypton* (gen. nov.) *amboinense*, *Catacauma microplacum*, *C. Robinsonii*, *Trabutia amboinensis*, *Asterina spectabilis*, *A. venustula*, *A. assimilis*, *Prillieuxina Loranthei* comb. nov. (*Asterinella Loranthei*), *P. microspila*, *P. amboinensis*, *Parasterina melanochetes*, *Calothyrium vile*, *Lembosia Robinsonii*, *Echidnodes xenospila*, *Thyrosoma* (gen. nov.) *pulchellum*, *Byssogene* (gen. nov.) *amboinensis*, and *Asteromella polystigma*.—E. D. Merrill.

1989. SYDOW, H. Über einige wenig bekannte Uredineen aus dem Kew Herbar. [Concerning some little known Uredinaceae from the Kew Herbarium.] *Ann. Mycol.* 20: 54-60. 1922.—The author reports on the result of an examination of the original specimens of 19 species of *Uromyces* and *Puccinia* chiefly named by Berkeley or Cooke. A redescription of each valid species is given. *Uromyces Diploglottidis* Cke. & Mass. is transferred to the genus *Ctenoderma*. Several species are considered synonymous with species previously or subsequently described.—H. S. Jackson.

1990. SYDOW, H. Über einige weitere im südlichen China (Kwangtung-Provinz) gesammelte Pilze. [Concerning some additional fungi collected in southern China.] *Ann. Mycol.* 20: 61-65. 1922.—A report is given of 2 collections of fungi made by E. D. Merrill and C. W. Howard. A total of 31 species is listed. The following new species are described: *Aecidium Raphiolepidis* on *Raphiolepis indica*; *Meliola leptoclada* on *Schefflera octophylla*; *Englerulaster sinensis* on *Ilex ficoidea*; *Melasmia Alni* Syd. on *Alnus* sp.; *Puccinia polystegia* on *Daedalacanthus nervosus*; *Phyllachora pennisetina* on *Pennisetum alopecuroides*, *Cercospora atrides* on *Bridelia monoica*; *C. micromera* on *Sapium sebiferum*. A new genus of Fungi Imperfecti, *Elaeodema* based on *E. Cinnamemi* n. sp. on fruits of *Cinnamomum pedunculatum*, is described.—H. S. Jackson.

1991. VUILLEMIN, PAUL. Relations entre les chlamydospores et les boucles mycéliennes. [The relation between chlamydospores and clamp-connections.] *Compt. Rend. Acad. Sci. Paris* 174: 1148-1149. 1922.—The clamps are formed by a process which is intermediate between exogamy and endogamy. They are homologous to the ascus hooks of the ascomycetes. They are found on the binucleate mycelium which characterizes the diplo-phase of both ascomycetes and basidiomycetes. In some forms, chlamydospores bear the same relation to the asci and basidia as do the clamps. It is believed that the production of clamps is not necessary to the development of asci and basidia. The chlamydospores of *Nyctalis Asterophora* are homologous to the clamps of *N. parasitica*. In like manner the chlamydospores of *Bornetina Corium* are homologous to the clamps of *B. aurea*.—C. H. Farr.

1992. VUILLEMIN, PAUL. Une nouvelle espèce de *Syncephalastrum*; affinités de ce genre. [A new species of *Syncephalastrum*; the affinities of the genus.] *Compt. Rend. Acad. Sci. Paris* 174: 986-988. 1922.—This new species is parasitic on *Rhizopus*. It is concluded that this genus should be classified in the tribe Absideae of the Mucoraceae.—C. H. Farr.

1993. WELLES, C. G. A provisional list of the parasitic fungi of the Philippine Islands. *Philippine Agric. Rev.* 15: 149-202. 1922.—About 958 species in 260 genera are listed, with their recorded hosts. A host index and an index to genera and families are given. No bibliographic references are included.—E. D. Merrill.

1994. WILSON, GUY WEST. Notes in some fungi from Eastern Kansas. *Trans. Kansas Acad. Sci.* 30: 171-174. 1919/21 [1922].—This is an annotated list of 43 species, chiefly from the vicinity of Lawrence.—F. C. Gates.

1995. WILSON, MALCOLM. A new species of *Phomopsis* parasitic on the Douglas fir. Trans. and Proc. Bot. Soc. Edinburgh 28: 47-49. 1920.—*Phomopsis Pseudotsugae*, attacking Douglas fir, *Pseudotsuga taxifolia* (= *Douglasii*), is described. It attacks the leading shoots and also the trunks of young trees and causes their death. It appears to be widely distributed in Scotland.—*Roxana Stinchfield Ferris*.

1996. Воронихинъ, Н. Н. [WORONICHIN, N. N.] Къ флорѣ Рhycomycetes Кавказа. [Contribution to the phycomycetous flora of the Caucasus.] Вѣстникъ Ткъфлискаго Вotаническаго Сада Тифлисъ [Bot. Gard. Tiflis Bull.] 50. 1920.—The Mycological Flora of the Caucasus has been very thoroughly investigated in the last 25 years and mycologically this region is one of the best known in Russia. Not all the groups of fungi have been equally investigated, and the aquatic fungi have been little known. In this pamphlet the author pays special attention to these and has identified 9 species, belonging to the Chytridineae (4), Ancylistineae (4), and Pythiaceae (*Pythium gracile*). *Lagenidium papillosum* Cocc. on *Spirogyra* is reported from Russia for the 1st time, being known previously only from Italy. In *Pythium gracile* oospores, previously unknown in the species, were found in great number; they are spherical, hyaline, smooth, and measure 8-15.8 μ (usually 12.6-14 μ). *Pythium tenue* Gobi, which is similar, has larger oospores and differs in several other points. E. J. Butler described oospores belonging to a form identified by him as *Pythium gracile* [An Account of the Genus *Pythium*. Calcutta, 1907], but their size is somewhat larger (13-24 μ).—A. Jacewski.

1997. Воронихинъ, Н. Н. [WORONICHIN, N. N.] Микологическія замѣтки. I: Нѣкоторые результаты микологическихъ изслѣдованій въ районѣ Воржомъ-лереваль Цхра Цхаро. [Mycological notes. I. Some results of mycological researches in the region Borjome-Tskhratskharo.] Извѣстія Кавказскаго Мчзея Тифлисъ [Bull. Caucasian Mus. Tiflis] 12: 1918.—The author enumerates and describes 25 fungi from different groups, mostly Imperfecti, collected in the alpine and subalpine region near Borjom in the summer of 1916. The majority are rather common species, but some are new for Russia, namely: *Septoria bulgarica* Bub. & Malk., previously known only in Bulgaria on *Cirsium appendiculatum* and found here on *Cirsium obvallatum*; *Septoria Daniloï* Bubak, described from Montenegro on *Geranium lucidum* and found here on *Geranium pallens* with larger stylospores (72-82 \times 2 μ) and pycnidia (170-187 \times 155-187 μ); *Septoria Pyrethri* Bres. & Krieger, known from Germany on *Pyrethrum Parthenium* and discovered here on *Pyrethrum macrophyllum*.—A. Jacewski.

1998. Воронихинъ, Н. Н. [WORONICHIN, N. N.] Новые виды грибовъ съ Кавказа. [New or little known fungi from the Caucasus.] Вotаническіе Матеріалы Института Слоровыхъ Раствній Главнаго Вotаническаго Сада. [Notulae Systematicae Inst. Crypt. Hort. Bot. Petropolitani] 1: 33. 1922.—Latin diagnoses are given of 4 new fungi collected in Transcaucasia. One species, *Elenkinella mirabilis*, represents a new genus belonging to the family Englerulaceae, typical tropical forms characterized by the dehiscence of the perithecia. This new genus is chiefly differentiated from others of the same family by the tri-septate, hyaline spores. The species is peculiar in its habitat, being found in the glands of the leaves of *Verbascum pyramidatum*. The other new species described by the author are rusts: *Puccinia Coronillae* (teleutospores on *Coronilla cappadocica*), *Aecidium Coronillae* (on the same host and associated with the former), *Aecidium Willemetiae* (on leaves of *Willemetia tuberosa*, differing from the aecial stage of *Puccinia Willemetiae* Bubak in the structure of the pseudo-peridia and the difference in size of the spores).—A. Jacewski.

1999. Вороновъ, Ю. Н. [WORONOV, G. N.] Сводъ свѣдѣній о микофлорѣ Кавказа. Часть I. Списокъ грибовъ по сихъ лорѣ извѣстныхъ для кавказа. Юревъ. [Bibliographical index to the Caucasian fungus flora. Part I. Description of Caucasian fungi now known.] 200 p. Yuriev, 1915.—During the last 25 years the Caucasus has been thoroughly investigated by a number of able mycologists (Speschnev, Woronichin, Siemaschko, Woronov, and others) and their studies have been published in a great many different papers. Therefore an index

has been necessary and will be of great aid in further work. The index is similar to the Bibliographical Index of North American Fungi begun by W. G. Farlow, but instead of the alphabetical arrangement the classification of Engler und Prantl in *Die Pflanzenfamilien* has been followed. In this 1st part there are enumerated 445 genera with 1734 [since 1915 this number has considerably increased, and one of our best mycologists, living now in Tiflis, N. N. Woronichin, estimates in 1920 the approximate number of Caucasian fungi equal to 3000, nearly 50 per cent of the whole Russian mycological flora.—*Collaborator's Note.*] species found in Caucasus (inclusive of the Fungi Imperfecti). This is a rather large number considering the fact that for all of Russia the actually known species are estimated at approximately 6000 (inclusive of the Myxomycetes and Fungi Imperfecti) in 878 genera. This rather large number is explained by the great climatic differences present. In the alpine region of the Caucasian chain northern and subpolar species are found, while near the Black Sea, at Suchum and Batum it is not rare to detect typical subtropical forms (*Pseudocolus*, *Asterina*). The 2nd part of this work will contain a bibliographical catalogue. It is intended also to give a list of the herbaria in which Caucasian fungi are to be found, a complete list of the collectors, an alphabetical list of the fungi and of the different hosts, and a history of Caucasian mycology.—A. Jacewski.

2000. ZELLER, S. M. Morphological differences between *Nectria galligena* Bres. and *N. coccinea* (ditissima). [Abstract.] *Phytopathology* 12: 442. 1922.

LICHENS

2001. BATTEN, LILY. Note on the occurrence of *Arthopyrenia foveolata* at Plymouth. *Jour. Marine Biol. Assoc. United Kingdom* 12: 557. 1921.—*Arthopyrenia foveolata* is a crustaceous calcareous lichen occurring at Plymouth, England, in large patches on rocks both above and below the high-water mark and also on limpets and barnacles. It was first found on the coast of Yorkshire in 1901 and has since been collected at various places on the coast of Ireland. The algal element is filamentous and yellowish and belongs to the genus *Trentepohlia*. The perithecia are minute.—Marshall A. Howe.

2002. FINK, BRUCE. Lichens. [Rev. SMITH, ANNIE L. Lichens. xxvii + 404 p., 165 fig. Cambridge Univ. Press: England. 1921 (see Bot. Absts. 11, Entry 3459).] *Bot. Gaz.* 74: 115-117. 1922.—Though recognizing many valuable features of the work, the reviewer finds it necessary to object vigorously to the maintenance in it of the old idea that "lichens are not plants, but yet in some mysterious way are plants." He believes it to be very unfortunate that the author could not have followed the modern and logical interpretation that lichens are fungi using algae as hosts. [See also Bot. Absts. 10, Entry 629; 11, Entries 274S, 2749, 3424.]—B. W. Wells.

2003. HÜEG, OVE. Die norwegischen *Nephroma*-Arten. [The Norwegian species of *Nephroma*.] *Nyt Mag. Naturvidenskab.* 60: 85-97. Pl. 1, fig. 1-3. 1922.—A key to the Norwegian species of *Nephroma* and a survey of their occurrence and distribution are given. Five species belong to the Norwegian flora.—The anatomical features of the genus are described. The "papillae" on the under side of *N. resupinatum* are always present in this species, but never in the other European species of the genus. The anatomy presents considerable similarity to the cyphellae in *Sticta*, and the physiological function must also be the same, corresponding to the stomata of the higher plants.—The tomentum on the under side of the thallus is composed of branched hairs, from which curious spherical cells are set free. The pycnids in all species are described, located on the under side of the thallus in *Nephroma expallidum*.—K. Münster Ström.

2004. MELLOR, ETHEL. Les lichens vitricoles et la détérioration des vitraux d'église. [Lichens on glass and the deterioration of church windows.] *Rev. Gen. Bot.* 34: 280-285, 336-345. 1922.—The flora of glassware is usually made up of crustaceous lichens which exist for the most part on the exterior surface; a notable exception is *Biatorina erysiboides*,

which exists only on the interior surface. The factors influencing the vitricolous lichens in their selection are: (1) the surface of the glass, whether it be smooth and shining or corroded; (2) such agents as wind, rain, and sun; (3) the number of species which grow in the neighborhood; (4) diffuse light and tainted air. *Caloplaca vitricola* with its variety *violacea* is described as new. The study on corrosion of glass furnished the following conclusions: (a) The immediate cause of corrosion is the mechanical action exerted by the vitricolous lichens on the surface of glass altered chemically; (b) the chemical alteration of glass is accelerated by the presence of vitricolous lichens; (c) the glass colored yellow by silver resists corrosion for a long time; (d) an annual cleaning of the glass is sufficient to protect it against the invasion of vitricolous lichens, for the germination of spores and growth of thalli is very slow. In addition, the mechanical action on glass is at a minimum during the first months of development. The lead frame should be kept in a good state of preservation.—The action of lichens on rocks particularly slate and feldspar was also studied. The action was found to be much the same as on glass. By increasing the rapidity of weathering the lichens play an important role in the beginning of the change from rock to soil.—*J. C. Gilman.*

BACTERIA

2005. DUFRENOY, J., et R. MOLINERY. Resultats de recherches d'hydrobiologie thermale poursuivies à Bareges et à Luchon. [Results of investigations of the biology of thermal springs in Bareges and Luchon.] Jour. Med. Bordeaux. 1922.—Three physiological groups of microorganisms are considered: (1) those which secrete peptic zooglaeae forming "Barègine" deposits; (2) Thiobacteriaceae, chiefly *Thiothrix*; (3) Ferrobacteriaceae, *Clonothrix*, *Leptothrix*, and *Sederocapsa*.—*J. Dufrénoy.*

2006. JENNISON, H. M. Potato blackleg with special reference to the etiological agent. [Abstract.] Phytopathology 12: 444. 1922.

2007. LÖHNIS, F. Studies upon the life cycles of the bacteria. I. Review of the literature 1838-1918. Mem. Nation. Acad. Sci. [U.S.A.] 16: 1-335. Pl. A-S, 1-23. 1921.—In the light of the results obtained by the author and N. R. Smith in studies of the *Azotobacter* group it was thought advisable to review all the important literature in the hope of finding further confirmation of amorphic or symplasmic stages and different types of regeneration of bacteria. Though the author feels that the existing classification does not truly express natural relationships, it is followed for convenience. The review of the literature, which is discussed more from a morphological than from a physiological standpoint, is divided into these headings: (1) different cell forms; (2) reproductive organs (gonidia, regenerative bodies, spores, microcysts); (3) formation of symplasm and regeneration of cells; (4) conjunction; (5) methods. A bibliography of 133 pages is given.—*Roxana Stinchfield Ferris.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 1817, 2125, 2126, 2206)

2008. ANONYMOUS. A forest under the city of Washington. Science 56: 529-530. 1922.—An excavation disclosed a layer of black swamp muck containing large quantities of well preserved tree trunks and large stumps. The trees were bald cypress and lived in the latter part of the Great Ice Age.—*C. J. Lyon.*

2009. ANONYMOUS. The Devonian forest at Gilboa, N. Y. Science 56: 565. 1922.—Work of excavation by the New York Board of Water Supply at Gilboa, New York, has brought to light many large specimens of the earliest known trees. These trees, though known for many years, have heretofore disclosed no definite relationships. WINIFRED GOLDRING finds evidence of their being seed ferns (Pteridospermophyta) much like *Lyginopteris* but simpler in organization.—*C. J. Lyon.*

2010. CARPENTIER, ALFRED. Sur les conifères et les fougères du Wealdien de Féron-Glageon. [On the conifers and ferns of the Wealdian of Féron-Glageon.] Compt. Rend. Acad. Sci. Paris 174: 1121-1124. 1922.—The Wealden flora of northern France contains numerous traces of conifers, ferns, cycadophytes, and Ginkgoales. Descriptions of a number of conifers and ferns are given.—C. H. Farr.

2011. FENTON, CARROLL LANE. The Hackberry stage of the upper Devonian. Amer. Midland Nat. 6: 179-199. Pl. 1, fig. 2. 1920.—The locality of the formation described in the paper is Hackberry Grove Clay Bank in section 35, Portland Township, Cerro Gordo County, Iowa. The author lists the fossils (mainly animal) in each of 3 divisions of the formation. The plant forms are classified as "fucoids" of which "at least two species" are found in the Owen substage, "three or more" in the Spirifer zone, and "several species" in the Striatula zone. None of these plant species are described or named by the author.—Sister M. Ellen.

2012. FLORIN, R. On the geological history of the Sciadopitineae. Sverg. Bot. Tidskr. 162: 260-270. Fig. 2. 1922.—*Sciadopitys*, represented in the existing flora by a single Japanese species, is regarded as an old type. The author finds that the linear leaves with a median furrow, in which the stomata occur and in which the epidermal cell arrangement is less distinctly seriate, afford distinctive features readily recognizable in microscopic preparations of fossil cuticular material. He considers that *S. tertiaria* Menzel, from the German Tertiary, is close to the existing species, and that the fossil genus *Sciadopitytes* of Goeppert is also related to it. To *Sciadopitytes* he refers several species from Greenland which Heer described as *Pinus*, and describes the following new species: *S. Hallei*, *S. scotica*, *S. macrophylla*, and *S. scanica*. In all 12 species of *Sciadopitytes*, ranging in age from Rhaetic to Upper Cretaceous, are enumerated. A fuller discussion is promised in a future publication.—E. W. Berry.

2013. FLORIN, R. Über das Vorkommen von *Sciadopitys* im deutschen Tertiär. [On the occurrence of *Sciadopitys* in the German Tertiary.] Senckenbergia 4: 1-5. Pl. 1. 1922.—The author describes the epidermal characters of specimens from the upper Pliocene of Klärbecken, Frankfurt, and concludes that they represent *Sciadopitys* and are identical with the lower Miocene species *S. tertiaria* Menzel.—E. W. Berry.

2014. FRENTZEN, K. Die Keuperflora Badens. [The Keuper flora of Baden.] Verh. Naturw. Ver. Karlsruhe 28: 1-76. Pl. 1-4. 1919.—This is a revision of the Keuper or upper Triassic flora of this classic region of southwestern Germany; 28 species are described. These include 3 Arthropytes of the genera *Equisetites* and *Neocalamites*; 12 ferns of the genera *Anopteris*, *Pecopteris*, *Sphenopteris*, *Gleichenites*, *Clathropteris*, *Dictyophyllum*, *Chiropteris*, and *Danaeopsis*; 7 Cycadophytes of the genera *Pterophyllum*, *Dioonites*, and *Otozamites*; 2 Ginkgoales of the genus *Baiera*; 2 Coniferophytes of the genera *Voltzia* and *Widdringtonites*; coniferous wood and the uncertain genus *Schizostachyum*, possibly representing the cones of *Neocalamites*.—E. W. Berry.

2015. JOHNSON, T., and J. G. GILMORE. *Libocedrus* and its cone in the Irish Tertiary. Sci. Proc. Roy. Dublin Soc. 17: 66-70. Pl. 4. 1922.—*Libocedrus salicornioides* (Unger) from the bore at Washing Bay, and from the Interbasaltic at Ballypalady, Ireland, is described.—E. W. Berry.

2016. JOHNSON, T., and J. G. GILMORE. The lignite of Washing Bay, Co. Tyrone. Sci. Proc. Roy. Dublin Soc. 17: 59-65. Pl. 3. 1922.—Microscopic study of material from a deep boring shows it to represent the species *Sequoia Coultssiae* Heer, a widespread Tertiary conifer. Much of interest in the comparative anatomy of *Sequoia*, *Athrotaxis*, *Taiwania*, *Taxodiioxylon*, *Taxodium*, and *Cupressinoxylon* comes out of the discussion.—E. W. Berry.

2017. KRÄUSEL, R. Beiträge zur Kenntnis der Kreideflora I. Über einige Kreidepflanzen von Swalmen (Niederlande). [Contributions to knowledge of the Cretaceous flora I. On Cretaceous plants from Swalmen, Holland.] Mededeel. s' Rijks Geol. Dienst A2:

1-40. *Pl. 1-5.* 1922.—The following are identified from between 642-659 m. in a deep bore at Swalmen, Holland: *Didymosaurus comptoniaefolius*, *Araucaria crassifolia*, *Elatocladus elegans*, *Moriconia cyclotoxon*, *Sequoia reichenbachii*, *S. sp.*, *Myrica cretacea*, *M. longifolia* (?), and *M. pseudoquercifolia*, the last being described as new. The epidermal characters of a number of these are described and it is concluded that the geological horizon is the same as the Upper Cretaceous Aachen (Aix-la-Chapelle) sands.—*E. W. Berry.*

2018. SCOTT, D. H. The present position of the theory of descent, in relation to the early history of plants. Rept. British Assoc. Adv. Sci. 1921: 170-186. 1921.—[See Bot. Absts. 11, Entries 502, 521.]

2019. THOMAS, H. H. On a new group of angiospermous fruits from the Middle Jurassic of Yorkshire. [Abstract.] Rept. British Assoc. Adv. Sci. 1921: 452. 1921.

2020. WEBSTER, CLEMENT L. Observations on some marine plants of the Iowa Devonian, with descriptions of new genera and species. Amer. Midland Nat. 6: 286-289. 1920.—Six new species, 5 of which are included in 3 new genera of the upper Devonian or Hackberry group at Bloody Run in Floyd County, Iowa, are described as follows: *Zearamosus elleria* n. gen., n. sp.; *Gracilirectus Hackberryensis* n. gen., n. sp.; *Fruticristatum iowense* n. gen., n. sp., and the new forms *moraense* and *pervetus*; *Buthotrephis thomasia* n. sp.—*Sister M. Ellen.*

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 1537, 1538, 1552, 1558, 1559, 1560, 1601, 1623, 1641, 1662, 1668, 1685, 1689, 1693, 1700, 1702, 1703, 1713, 1715, 1728, 1753, 1789, 1827, 1835, 1837, 1841, 1852, 1856, 1860, 1865, 1880, 1883, 1889, 1894, 1951, 1953, 1957, 1959, 1961, 1965, 1966, 1971, 1972, 1973, 1981, 1985, 1992, 1993, 1995, 2006, 2107, 2127, 2129, 2142, 2149, 2150)

DISEASES CAUSED BY FUNGI

2021. B[ERNARD, CH.] Djamoer oepas op Sesbania. [Poison fungus on Sesbania.] De Thee 1: 44-45. 1920.—*Djamoer oepas* (*Corticium Javanicum*) attacks *Sesbania* as it does many legumes under favorable circumstances. A crust of *Capnodium*, growing in the sweet excrement of a cicada (*Lawana*), provided a moist cover which favored the development of the *Corticium* in the serious attack observed.—*Carl Hartley.*

2022. BERNARD, CH., en A. KEUCHENIUS. Bestrijding van wortelziekten. [Control of root diseases.] De Thee 1: 35-41. 1920.—This is a preliminary report of tests with soil disinfectants and amendments against the "split-canker" fungus (*Armillaria*) and the red root fungus (*Poria*) of tea. Plants in the earliest stages of disease were treated. The amounts of the different substances added were, per plant, 8½ l. of 1 per cent carbolic acid; 1½ l. of 10 per cent carbolineum; 8½ l. of wood ashes + an equal quantity of water containing 30 cc. carbolic acid; and air-slaked lime. The carbolic acid treatment proved useless; lime and carbolineum seemed to have some value; ashes with carbolic acid proved disappointing. On another estate the application of 3 and 9 kgm. wood ashes per plant, the former on a large scale, indicated value. In a 3rd locality lime treatment was followed by improvement, and parallel ammonium sulphate treatment by an increase in disease. The tests will be continued. Crude inoculation with *Armillaria* by placing diseased roots and stumps in the soil was successful.—*Carl Hartley.*

2023. CIFERRI, R. Una rara malattia delle foglie del susino. [A rare disease of plum foliage.] Riv. Patol. Veg. 12: 59-64. 1922.—A rare affection of leaves of plum, variety Luther Burbank, was found to be due to a fungus morphologically identical with *Microstroma*

Tonellianum Ferraris. The spores are borne on basidia-like conidiophores crowded closely together inside the epidermis on the under side of the leaf. A part of the literature on the systematic position of the genus *Microstroma* is reviewed.—*F. M. Blodgett*.

2024. DIETRICH, F. O. Über die Erkrankung der Kartoffeln. [Disease in potatoes.] Mitteil. Deutsch. Landw. Ges. 37: 614-616. 1922.—The author discusses the effect of drought and other meteorological conditions on potato diseases and on the yield in Germany, giving especial attention to potato wart. The selection of healthy plants and wide spacing are advised.—*Lillian C. Cash*.

2025. FULTON, H. R. Occurrence of *Thielaviopsis paradoxa* on the cocoanut palm in Florida. Phytopathology 12: 398-399. 1922.—*Thielaviopsis paradoxa* (De Seyne) v. Höhn. was found causing a decay in the trunk of a cocoanut palm (*Cocos nucifera*).—*B. B. Higgins*.

2026. GARRETSEN, A. J. Roetdauw. [Sooty mold.] De Thee 2: 56-57. 1921.—*Hormiscium* sp. developed strongly on tea in Java in the honey-dew exuded by *Tachardia* sp. Leaf function was interfered with; and in some cases partial defoliation resulted. Brushing the branches is recommended.—*Carl Hartley*.

2027. HALL, C. J. J. VAN. Voorloopige mededeeling over de wortelschimmels van de thee. [Preliminary account of the root diseases of tea.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Proefsta. Thee Mededeel. 58. 26-27. 1918.—Seven kinds of root diseases are briefly considered and ascribed to the following fungi: *Rosellinia* (*bothrina*?), *R. (bunodes?)*, *R. sp.*, *Ustilina zonata*, *Poria hypolateritia*, *Hymenochaete noxia*, and *Armillaria*?.—*R. D. Rands*.

2028. HEMMI, TAKEWO. On the occurrence of *Mycosphaerella* wilt of muskmelons in Japan. Phytopathology 12: 394-397. 1922.—The occurrence in Japan of *Mycosphaerella citrullina* (Smith) Gross on muskmelon, cucumber, and on a kind of gourd (*Lagenaria vulgaris* var. *gourda* Ser.) is reported.—*B. B. Higgins*.

2029. HURSH, C. R. The relation of temperature and hydrogen-ion concentration to urediniospore germination of biologic forms of stem rust of wheat. Phytopathology 12: 353-361. Fig. 1-7. 1922.—Two biologic forms of *Puccinia graminis*, differing markedly in their ability to parasitize certain varieties of wheat, were selected for this study. The percentage germination of the urediniospores of the 2 forms was compared in solutions of various H-ion concentration and at temperatures of 10, 20, and 30°C. One form was decidedly more tolerant than the other to variations in temperature and H-ion concentration, showing that biologic forms may be demonstrated by specific physiological reactions. Tolerance to variations in temperature and in H-ion concentration was, in this instance, associated with a wider range of hosts.—*B. B. Higgins*.

2030. PELTIER, GEORGE L. A study of the environmental conditions influencing the development of stem rust in the absence of an alternate host. 1. The viability of the urediniospores of *Puccinia graminis* Triticum form III. Nebraska Agric. Exp. Sta. Res. Bull. 22. 15 p., 3 fig. 1922.—The author reports experiments on the viability of urediniospores of stem rust of wheat under controlled conditions. A series of temperatures were used ranging from 5 to 30°C., at 5° intervals. The spores were submitted at each temperature to relative humidities ranging from 0 to 100 per cent at approximately 10 per cent intervals. The viability of the spores was determined by germination tests in the laboratory and by infection tests in the greenhouse. The conclusions reached are: (1) The influence of relative humidity on the viability of the urediniospores of *Puccinia graminis* Triticum form III is very pronounced and closely associated with temperature; (2) at high relative humidities, depending somewhat on the temperature, the percentage of germination is low and the period over which the spores are viable is very short; (3) the same relation exists at the low relative humidities except that it is not so pronounced and is more variable; (4) the highest percentage of germination and

the longest viable period of the spores occur at the medium relative humidities. At the medium relative humidities high temperatures lower the percentage of germination and shorten the viable period while at low temperatures the opposite occurs.—*T. A. Kiesselbach.*

2031. SIGGERS, PAUL V. *Torula ligniperda* (Willk.) Sacc., a hyphomycete occurring in wood tissue. *Phytopathology* 12: 369-374. *Pl.* 25. 1922.—In testing the strength of blocks, using shipments of yellow poplar (*Liriodendron tulipifera* L.) and white ash (*Fraxinus americana* L.), the strength values varied considerably although the wood appeared sound. Microscopic examination showed that hyphae and spores of a fungus, later identified as *Torula ligniperda* (Willk.) Sacc., were present in the lumen of the cells. The fungus was isolated from the poplar wood, and its effect on sterile blocks of several species was studied.—*B. B. Higgins.*

2032. STONE, R. E. Leaf scorch or Mollisiose of the strawberry. *Phytopathology* 12: 375-380. *Fig.* 1-3. 1922.—The symptoms and etiology of the disease and the relative susceptibility of strawberry varieties are discussed. The disease appears in the early spring as small, irregular, purple blotches on the leaves and as purple streaks on the leaf petioles and flower peduncles. The blotches enlarge rapidly, and their centers die and turn gray. As the blotches enlarge they coalesce until by mid-summer the entire leaf is frequently involved and killed. On the dead spots the acervuli of a fungus identified as *Marsonia Potentillae* (Desm.) Fischer were found. The following spring ascocarps of *Mollisia earliana* (E. & E.) Sacc. were found on the dead leaves. Cultures obtained from single ascospores of this fungus produced conidia of the *Marsonia* type. Strawberry plants inoculated with conidia from these cultures developed typical leaf scorch symptoms, indicating the genetic connection of the 2 spore forms.—*B. B. Higgins.*

2033. STOUTAMIRE, RALPH. What makes the orange mushy? *Florida Grower* 28¹³: 4-5. 1922.—This is a popular description of the softening influence of stem-end rot (*Phomopsis Citri*) upon orange fruit.—*J. C. Th. Uphof.*

2034. WILTSHIRE, S. P. A disease of Michaelmas daisies. *Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta.* 1920: 84-85. 1920.—A disease which the author thinks is caused by a fungus of the *Fusarium* type causes a yellowing of the bottom leaves, checking of growth, sometimes premature flowering, and earlier dying of individual shoots. "A fungus has been isolated from the diseased tissues, and preliminary inoculation experiments indicate that it is the cause of the disease." The fungus grows in the conductive tissue and thus stops the water supply. No control method is recommended except marking diseased plants in order to avoid propagating from them, and burning of infected material.—*W. H. Chandler.*

2035. WILTSHIRE, S. P. The bark canker disease of apples. *Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta.* 1920: 81. 1920.—Cankers on the main branches of apple trees caused by *Myxosporium corticolum* Edgerton were found in the orchards at Long Ashton. The injury seemed to be slightly worse than that reported in the U. S. A.—*W. H. Chandler.*

2036. WILTSHIRE, S. P., and G. T. SPINKS. Apple tree canker. *Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta.* 1920: 82-83. 1920.—This is a discussion of the infection of young apple buds by *Nectria ditissima*. Cracks in the leaf-scar tissue seem to be a means of entrance for the fungus. As long as the leaves remained on the tree no autumn infection occurred. Spraying seemed to reduce the number of cankers formed. A more complete report is promised.—*W. H. Chandler.*

DISEASES CAUSED BY BACTERIA

2037. GOSSARD, H. A., and R. C. WALTON. Dissemination of fire blight. *Ohio Agric. Exp. Sta. Bull.* 357. 81-126, *fig.* 1-13 + 3 *fig.* unnumbered. 1922.—This bulletin comprises a report of a series of studies on fire blight dissemination conducted by the junior author in

cooperation with the department of entomology. It was found that *Bacillus amylovorus* may live in honey for 72 hours or more. Infections were obtained by the use of honey taken from 3 hives, by the use of apple pollen removed from the baskets of bees caught as they were entering the hive, and by inserting the mouth parts of bees into incisions made in tender twigs. The fire blight organism was found to be alive in aphid honey-dew after 7 full days, and to survive in peach, plum, and cherry nectar for 5 days. Rain was proved to be the most important factor in the dissemination of infection over a tree after centers are established, and especially if the latter are near the top. It was estimated that 50-90 per cent of blossom infection was accomplished by infected rain water. Seventy-two hours after pollination, blossoms are only slightly susceptible to infection, and after 144 hours they are practically immune. Several sucking and boring insects were observed to be carriers of fire blight. All experiments with ants were negative. The authors suggest that there is ample ground for crediting blossom fire blight with traveling northward with the zone of inflorescence to a greater extent than is now accepted. The fire blight organism was not found to be sensitive to the electric violet ray.—R. C. Thomas.

2038. GROENEWEGE, J. Landbouwkundige onderzoekingen over de slijmziekte. [Agricultural investigations of slime disease.] Dept. Landb. Nijv. en Handel [Nederland.-Indië] Alg. Proefsta. Landb. Mededeel. 12. 79 p., 16 pl. 1922.—The peanut (*Arachis hypogaea*), even with wounded roots, may remain healthy in soil or water cultures containing the causal organism (*Bacterium Solanacearum*) of this disease. This bacterium is believed to be a normal constituent of the soil flora, and the incidence of the disease which it causes is dependant on environmental conditions favoring the susceptibility of the host. Susceptibility of peanut and tobacco is due to lack of soil oxygen. When diseased plants are found in soils in good general tilth the roots are seen to be decayed at and below points where they pass through clods. These clods exhibit an internal blue color due to imperfectly oxidized iron compounds. Death of the root at such a point is directly due to oxygen hunger; the bacteria subsequently use the lesion as an infection port. In pot experiments, 61 per cent of the plants growing in paraffined pots wilted, while in ordinary unglazed pots only 18 per cent showed disease symptoms. The rapid loss of virulence of *B. Solanacearum* in artificial cultures reported by other investigators was not observed. Honing's failure to secure infection with strains long in cultivation was due to the use as inoculum of subcultures which were 1-2 weeks old and therefore dead. The peanut is easily grown in a solution containing 0.1 per cent KNO_3 and 0.05 per cent each of CaSO_4 , MgSO_4 , and $\text{Ca}_3(\text{PO}_4)_2$ with a trace of Fe. In water cultures very young plants infected to the point of wilting, and with bacteria already in the petioles, in some cases recovered. The plants most diseased in water cultures were obtained under the driest atmospheric conditions. In both peanut and tobacco unquestionably infected plants developed new roots which appeared free from bacteria. It is concluded that the bacteria can spread only in the direction of the transpiration stream. The penetration of aerated water into the soil following the root downward is indicated by the finding of orange (therefore ferric) particles in otherwise blue soils. The presence of fresh organic matter in the soil is thought to increase the amount of disease by exhausting the oxygen supply. Adding sugar to pot cultures at the rate of approximately $\frac{1}{4}$ and $\frac{1}{2}$ per cent by weight, resulted in decreased disease. This is explained in connection with the effect of the sugar on the water-holding capacity of the soil. The fact that the disease in tobacco is more serious in north Sumatra than in Mid-Java is attributed to the poorer soil cultivation in the former locality.—Carl Hartley.

2039. JARVIS, E. Bureau of sugar experiment stations. Combating sugar cane pests. Cane pests on the Herbert River. Australian Sugar Jour. 14: 413-416. 1922.—The gumming disease (*Bacillus vascularum*) is prevalent throughout the Herbert River district, occurring mostly in Clarke's Seedling (H. Q. 426). The cane variety Badila is already infected and it is feared may become more so. The variety H. Q. 409, although practically immune to the gumming disease, is unpopular here because of its slow growth and tendency to arrow freely and very early. Selection of clean cane, planting of immune varieties, good drainage and cultivation of land, and the use of green manures are advised.—A brief discussion is also given to

the pest-destruction fund, to damage by rats and by white ants, and to a tachinid fly parasite of the cane borer.—*C. Rumbold*.

2040. MARTIN, J. P. Variation in color of pear blight exudate. *Phytopathology* 12: 399-400. 1922.—A dark green color was noted in the first exudate from a single loquat (*Eriobotrya japonica* Lindl.) twig inoculated with *Bacillus amylovorus* (Bur.) De T., while from other twigs inoculated at the same time the exudate had the normal color.—*B. B. Higgins*.

2041. THOMAS, ROY C. A bacterial rosette disease of lettuce. *Ohio Agric. Exp. Sta. Bull.* 359. 197-214, 8 fig. 1922.—A bacterial rosette disease of lettuce found chiefly in greenhouses in Ohio is reported. The disease closely resembles, and is thought to have been previously confused with, the older recognized form of rosette due to *Rhizoctonia*. Inoculation experiments have demonstrated the pathogenicity of the bacterium associated with the disease, and it is thought that the organism can survive indefinitely in the soil. Control experiments have shown that the formaldehyde-drench plan is an effective method of eradication. Steam sterilization is also suggested. Cultural studies of the pathogen have revealed points of similarity and of difference between it and another one causing a similar disease previously reported from South Carolina. The name *Aplanobacter Rhizoctonia* n. sp. is suggested for the Ohio organism.—*R. C. Thomas*.

2042. WILTSHIRE, S. P. A bacterial infection of plum trees. *Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta.* 1920: 78-80. 1920.—Trunks of large plum trees were found to have been killed, the part first killed being about 3½ feet above ground. Bacterial masses were constantly present in the diseased cortex of the many specimens examined, together with fungus hyphae and in many cases *Cytospora* fructifications. “. . . the association of the bacteria with the disease in such a number of cases is extremely suggestive and appears to be more than an accidental occurrence. The relationship between the bacterial organism and the fungus *Cytospora* is only a matter of conjecture. . . .”—*W. H. Chandler*.

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

2043. INSTITUT INTERNATIONAL D'AGRICULTURE. Enquête sur la lutte contre la mouche des olives (*Dacus oleae*) dans les divers pays. [Investigations on the control of the olive fly.] vi + 89 p. Imprimerie de la Chambre des Députés: Rome, 1922.—This report is an assemblage of various papers from different countries, relating to olive-fly control. Several bibliographies list the principal publications dealing with this insect, and its control and relation to disease transmission.—*Frederick V. Rand*.

2044. SCHLUPP, W. F. The principal orchard pests and how to control them. 29 p., 5 fig. Johannesburg, [192-?].—This is a brief, popular handbook dealing with the insects of the orchard and their control. Following a general introduction, the codling moth, and various fruit flies, aphids, and scale insects are in turn briefly discussed.—*Frederick V. Rand*.

2045. WAHL, BRUNO. Auftreten des Kolorado-Kartoffelkäfers in Südfrankreich. [Appearance of Colorado potato beetle in southern France.] *Oesterr. Zeitschr. Kartoffelbau* 2: 24. 1 fig. 1922.—The area infested is already 250 square km. and constitutes the largest area in Europe into which this potato pest has yet escaped. The warm climate of France is thought likely to be conducive to its further spread.—*F. Weiss*.

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

2046. BRUNER, STEPHEN C. Bibliographia. La enfermedad de las “rayas amarillas” en la caña. [Bibliography. The yellow stripe disease of sugar cane.] *Rev. Agric. Com. y Trab. Cuba* 5: 32-33. 1922.—This is a critical review of MOISES SIMONETTO's *La Enfermedad de las Rayas Amarillas en la Caña* (Su Importación y Extensión—Año y Medio de Observaciones en Cuba) [see *Bot. Absts.* 11, Entry 1776].—*G. R. Hoerner*.

2047. GARDNER, MAX W., and JAMES B. KENDRICK. Overwintering of tomato mosaic. Bot. Gaz. 73: 469-485. Pl. 17. 1922.—The authors find no evidence for the transmission of mosaic by way of the seed. They were successful in proving that the inoculum may overwinter in perennial herbs. Various species of the genus *Physalis* are important in this respect. Mosaic was found affecting *Physalis subglabrata*, *P. virginiana*, *P. heterophylla*, and *Solanum carolinense*. Evidence was obtained that the disease had spread to *Physalis* plants 200-400 feet away from infected tomato fields. Aphids and flea beetles are believed to play a part in the transmission to *Physalis* plants. The eradication of solanaceous perennial herbs in and near tomato fields is recommended as a control measure.—B. W. Wells.

PARASITIC PHANEROGAMS

2048. HERBERT, D. A. The parasitism of *Olax imbricata*. Philippine Agric. 11: 17-18. 1 fig. 1922.—*Olax imbricata* Blume (Malabaguio), a large woody vine with well developed leaves and a shallow and wide root system, occurs sparingly in Mount Makiling. Its large, rather soft roots branch and ultimately give rise to fragile white rootlets, which in contact with other roots produce a lateral haustorium of the same type as that found in the Santalaceae. Haustoria attached to a host root derive salts and water, as well as organic matter, from the host plant. Two of the 3 host plants observed were legumes. Self parasitism is common, and the best development of haustoria was found on roots of *Olax* itself.—Sam F. Trelease.

NON-PARASITIC DISEASES

2049. DEUSS, J. J. B. Kloetasch in theetuinien. [Ash from the Kloet in tea gardens.] De Thee 1: 67-68. 1920.—The eruption of the Kloet in East Java resulted in the deposition of an ash layer 5-20 cm. thick in a tea plantation. Defoliation and death of young plants followed. As a result of previous experience in this locality the ashes were worked into the upper soil as thoroughly as possible in order to prevent cementing into an impervious layer. The working in of as much organic matter as possible was also advised. On other plantations where the layer was only 1-1½ cm. deep it was turned under without injury to the plants.—Carl Hartley.

2050. FABRICIUS. [Rev. of: GRAEBNER, PAUL. Handbuch der Pflanzenkrankheiten begründet von Paul Sorauer. Vol. I. Die nichtparasitären Krankheiten. (Non-parasitic plant diseases.) 4th ed., 959 p., 264 fig. Paul Parey: Berlin, 1921 (see following entry).] Forstwiss. Centralbl. 44: 34-37. 1922.—This work is based on the theory that the chief causes of disease or weakness in plants, including susceptibility to parasitic diseases, are to be found in climatic, soil, or cultural conditions, and that the most effective means of combating the diseases are development of resistant forms and proper plant sanitation. The book does not overlook forestry and tree diseases, as so many books on plants do, but contains much of direct interest to foresters. It does omit some tree ailments, such as sun-scald.—W. N. Sparhawk.

2051. GRAEBNER, PAUL. Handbuch der Pflanzenkrankheiten begründet von Paul Sorauer. Vol. I. Die nichtparasitären Krankheiten. [Handbook of plant diseases founded by Paul Sorauer. 1. The non-parasitic diseases.] 4th ed., xv + 959 p., 264 fig. Paul Parey: Berlin, 1921.—This work constitutes a completely rewritten edition of volume 1 of SORAUER's Handbuch. In the words of Graebner, "The literature of this previously neglected and at the same time economically important subject had become so enormously increased that it was necessary to introduce extensive supplementary studies in spite of the fact that I had presented the non-parasitic diseases as a teacher for almost a quarter of a century. All using the third edition will recall how exceedingly difficult it is to find one's way through the complex subject matter. Therefore, so far as possible in adapting the present edition to the classification of Sorauer, I have undertaken a sharp delimitation of the sections and chapters in order to facilitate an understanding of the subject by the student and a rapid orientation by the specialist. As far as possible numerous references have been added as footnotes.—A number of new figures, especially photographic reproductions, have been included. To my

regret I have not succeeded in complying with the wish of the publisher to reduce the size of the work. On the contrary, through numerous supplementary additions, appearing especially in the corrections, it is even enlarged."—Under the general part of the work 3 sections deal respectively with historical phases of the subject, the nature of disease, and growth changes due to different geographical situation. In the 2nd part the special phases of the subject are exhaustively discussed under the following sections: (1) diseases caused by unfavorable soil conditions; (2) the influence of humidity, dryness, and movements of the air; (3) effects of heat and light; (4) wounds; (5) diseases caused by injurious gases and liquids; (6) the diseases exhibiting abnormal enzymatic functions under which are included the mosaic, sereh, and yellows groups, and several gummoses and resinoses.—This work is not to be confused with the *Lehrbuch der Nichtparasitären Pflanzen Krankheiten* [see Bot. Absts. 9, Entry 418], which is a concise textbook intended especially for students. [See also preceding entry.]—*Frederick V. Rand.*

2052. LA RUE, CARL D. **Lightning injury to *Hevea brasiliensis*.** *Phytopathology* 12: 386-389. 1922.—In the type of injury here discussed the current of electricity seems to pass principally through the cambium and young sap wood without external injury, such as tearing of the bark or branches. Usually one or more trees are killed and the surrounding trees more or less severely injured. The injury is most severe just back of the tip of a branch. When the injury is slight only the tips of the branches die. Death of the tissue is followed almost immediately with infection by *Diplodia*. Lightning injury to *Hevea* is, therefore, frequently diagnosed as "die back."—*B. B. Higgins.*

2053. SNELL, WALTER H., and NATHANIEL O. HOWARD. **Notes on chemical injuries to the eastern white pine (*Pinus Strobus* L.).** *Phytopathology* 12: 362-368. *Pl. 24, fig 1-2.* 1922.—Two instances of chemical injury to white pine trees are recorded. In one case the trees in an area approximately $\frac{1}{2} \times \frac{1}{4}$ mile in extent, adjacent to a brick kiln, were seriously injured, apparently by fumes from soft coal burned in the kiln. The leaves were reddish brown and from a distance appeared to be entirely dead; but close examination showed that the bases of many leaves were still green. Leaves of several broad-leaved species also showed injury. In the other case white pine trees were killed or severely injured by calcium chloride dissolved from metal containers which stood under the trees about a month.—*B. B. Higgins.*

DISEASES OF UNKNOWN CAUSE

2054. LEES, A. H. **A method of identifying reversion of black currants.** *Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta.* 1920: 66-70. *Pl. 4.* 1920.—Suggestions are given as to methods of identification and control of this disease. [See also Bot. Absts. 9, Entry 403; 11, Entry 4475].—*W. H. Chandler.*

2055. PALMER, W. B. **Pecan rosette.** *Proc. Ann. Convention Nation. Nut Growers' Assoc.* 20: 72-78. 1921.—This is a popular lecture. In the author's opinion water cannot be the main cause of rosette since the disease occurs under such widely varying water relations. After briefly reviewing the parts played by the various elements of plant nutrition and the results of experience in his own orchard, the author states that "Rosette can then be defined as that condition of a tree caused primarily by the lack of available nitrogen in the soil in which the tree grows or the inability of the tree to appropriate the nitrogen."—It is the rich nitrogen supply in the alluvial bottom lands, he says, that prevents rosette on such soils, and this is the deficient element in most soils. Rosette was relieved in his own orchard by heroic applications of nitrogen, but he does not think that the same result would necessarily follow in all orchards.—*Frederick V. Rand.*

2056. RAND, FREDERICK V. **Pecan rosette: its histology, cytology, and relation to other chlorotic diseases.** *U. S. Dept. Agric. Bull.* 1038. 42 p., 12 pl., (1 colored). 1922.—After a brief discussion of different types of plant chloroses a review is given of previously published histological and cytological studies relative to infectious chloroses and to chloroses caused

directly by soil or atmospheric conditions.—The 2nd part of the paper reviews the previous work on pecan rosette and then details the present histological and cytological investigation.—“As a class, the chloroses due to soil or atmospheric conditions are rather general effects which are more or less comparable to starvation, overfeeding, or direct poisoning. . . . In the specific chlorotic diseases of an infectious nature fundamental derangements in both physiological and structural development are simultaneously brought about. . . . The histological and cytological evidence suggests that pecan rosette in its specific sequence of signs and in the complexity of the structural and physiological derangements bears far more similarity to the known infectious chloroses than to those caused by soil or climatic conditions. Whether in this particular disease the factors responsible for alterations in the normal structure and metabolism must be introduced into the plant from without, or whether they originate within the plant itself, is a question yet to be answered; but whatever the ultimate solution of the problem the cause will undoubtedly not be found in any simple soil or water relation.”—A bibliography of 85 titles is appended.—*Frederick V. Rand.*

2057. WEAVER, WALTER. Pecan rosette. Proc. Ann. Convention Nation. Nut Growers' Assoc. 20: 67-72. 1921.—This is a popular lecture in which the author expresses the opinion that pecan rosette is strictly a moisture problem and due to excess of transpiration over intake. In support of this theory he draws the following from his own experience: No improvement after liberal feeding; quick results from manure mulch without appreciable rainfall; improvement under mulch with but little new growth; aggravation of rosette near barnyards with abundant food supply; marked aggravation following drought; appearance of rosette in late summer when the soil water supply is at a minimum and when high temperatures cause the greatest transpiration; and the usual absence of rosette in neglected orchards and near buildings where food is scanty and soil water is more abundant on account of shading, and where the roots are not disturbed or exposed to high temperatures. The rosette formation, indicating an adaptation to reduce transpiration, and the high percentage of pure water present in plants lend further support, he says, to this theory. The main suggestions for control include applications of potash and the use of cover crops.—*Frederick V. Rand.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

2058. ANONYMOUS. Control of insect pests and diseases of vegetable crops. Ohio Agric. Exp. Sta. Monthly Bull. 7: 89-97. 1922.—Methods which have proved efficient for the control of the most serious vegetable diseases found in Ohio are tabulated. A brief discussion is given of general cultural practices emphasizing sanitation, and brief directions are included for the preparation and use of current fungicides and methods of sterilization.—*R. C. Thomas.*

2059. B[ERNARD, CH.] Wortelziekten en boomstronken. [Root diseases and tree stumps.] De Thee 1: 25-26. 1920.—A planter reports much root disease in tea in the immediate vicinity of stumps of *Celtis cinnamomea*.—*Carl Hartley.*

2060. CHASE, W. W. The principal parasites of the peach. Georgia State Bd. Entomol. Bull. 61. 43 p., 19 fig. 1922.—This revision of bulletins 43 and 57 gives a spray schedule for peaches and discusses various fungus and insect parasites. Special attention is given to the relation of brown rot (*Sclerotinia fructigena* Schröt.) to the curculio. It is shown that a severe infestation of this insect increases the disease, and that there is also a relation between brown rot and excessive growth and moisture. Other parasites discussed are peach scab (*Cladosporium carpophyllum* Thum.), leaf curl (*Exoascus deformans* (B.) Fuckel.), peach tree borer (*Sanninoidea exitiosa* Say), plum curculio (*Conotrachelus nenuphar* Herbst.), San Jose scale (*Aspidiotus perniciosus* Comstock), shot-hole borer (*Scolytus rugulosus* Ratz), and nematode (*Heterodera radicola* (Greff.) Mul.).—*T. H. McHatton.*

2061. DEMAREE, J. B. Pecan disease investigations during 1921. Proc. Ann. Convention Nation. Nut Growers' Assoc. 20: 37-39. 1921.—This lantern slide lecture was given to ac-

quaint the growers with the lines of work being done rather than to show the results obtained. Experiments on rosette, scab, and kernel spot are briefly described and the locations given.—*Frederick V. Rand.*

2062. DOIDGE, ETHEL M. *Diseases of the apple, pear and quince.* 50 p., 17 fig. Johannesburg, [1917 ?].—This is a popular handbook briefly discussing the following diseases and their control: bitter rot (*Glomerella cingulata* (Stonem.) S. & S.), black rot (*Sphaeropsis Malorum* Peck), leaf blight (*Fabraea maculata* Atk.), scab (*Venturia inaequalis* Cke., and *V. pirina* Aderh.), powdery mildew (*Podosphaera leucotricha* (E. & E.) Salm.), bitter pit, die-back (*Valsa leucostoma* (Pers.) Fr.), apple cracking disease (*Coniothecium chomatosporium* Corda), crown gall (*Bacterium tumefaciens* Erw. Sm.), cankers (*Glomerella cingulata*, *Phylospora Cydoniae*, *Valsa leucostoma*, *Nectria ditissima* and sun scald). A general section on the prevention of diseases follows.—*Frederick V. Rand.*

2063. DOIDGE, ETHEL M. *Potato disease.* 49 p., 26 fig. Johannesburg, [1920].—This is a popular handbook briefly discussing the following diseases and their control: early blight or leaf curl (*Macrosporium Solani* E. & E.), scab (*Actinomyces chromogenus* Gasp.), corky or powdery scab (*Spongospora subterranea* (Wallr.) Johns.), black scab canker or wart (*Synchytrium endobioticum* Pers.), bacterial wilt (*Bacterium Solanacearum* Erw. Sm.), Rhizoctonia disease (*Corticium vagum* var. *Solani* Burt.), late blight (*Phytophthora infestans* de By.), and internal brown fleck.—*Frederick V. Rand.*

2064. EZEKIEL, WALTER N. *Photographing tube cultures.* *Phytopathology* 12: 399. 1922.

2065. MANUEL, H. L. *Faulty lime in Bordeaux mixture.* *Agric. Gaz. New South Wales* 33: 759. 1922.—Emphasis is placed on the fact that lime intended for Bordeaux mixtures should not be allowed to become carbonated.—*L. R. Waldron.*

2066. PENZIG, O. *Pflanzen-Teratologie systematisch geordnet.* [Plant teratology.] 2nd ed., much enlarged, Vol. I. xviii + xi + 283 p. 1921; Vol. II. 548 p. 1921; Vol. III. 624 p. Gebrüder Borntraeger: Berlin, 1922.—“Since the appearance more than twenty-five years ago of the first edition of this work, the observational material concerning plant anomalies and monstrosities has increased enormously and is to be found in many hundreds of papers and larger works distributed through the botanical literature of all lands. The time is, therefore, ripe for an exhaustive review of the observed facts gathered by various authors, and of their significance in the morphology and taxonomy of the individual groups discussed.”—Following the prefaces, introduction, and glossary the main part of volume 1 is given up to an alphabetically arranged bibliography. The remainder of the work gives bibliographical references and abstracts of published teratological data arranged according to the taxonomic position of the plants discussed. Volume 2 deals entirely with the dicotyledonous group Polypetalae, while volume 3 takes up the dicotyledonous Gamopetalae, and the monocotyledons, pteridophytes, bryophytes, fungi, lichens, and algae.—*Frederick V. Rand.*

2067. RAMSAY, A. A. *Storage experiments with lime intended for sprays.* *Agric. Gaz. New South Wales* 33: 747-749. 1922.—Fresh lime was slaked and kept under water for 172 days. A series of analyses during this period showed no appreciable diminution of the efficacy of the product.—*L. R. Waldron.*

2068. WRIGHT, HORACE J. *Plant pests and parasites. Preventives and remedies.* 32 p., 1 fig (on cover). “County Life.” London, 1922.—This brief, popular handbook takes up the pests and parasites (and their control) among (1) flowers, (2) fruits, and (3) vegetables. Sections on general enemies, and on useful washes and dressings are appended.—*Frederick V. Rand.*

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 1631, 1644, 1708, 1822, 1865, 1867, 1887)

2069. ANONYMOUS. Potash from kelp in Australia. Jour. Dept. Agric. Victoria 18: 498. 1920.—The average potash contents of the ash is about 14 per cent. Individual samples have yielded 30 per cent.—*Wm. E. Lawrence.*

2070. CHEEL, EDWIN. Notes on the "scarlet" and "blue" pimpernel. Australian Nat. 5: 18-19. 1922.—*Anagallis arvensis* is poisonous to birds. Some reasons are given for considering *A. arvensis* and *A. coerulea* as distinct species.—*T. C. Frye.*

2071. HASKIN, LESLIE L. The death Camas. Amer. Bot. 28: 141-143. 1922.

2072. HERBERT, D. A. Cyanophoric plants of the Makiling region. Philippine Agric. 11: 11-16. 1922.—By modifications of Guignard's sodium picrate test, 110 species, belonging to 41 families,—including native Philippine species, introduced fodder and food plants, ornamental plants, and weeds,—were tested for the presence of hydrocyanic acid, with the result that 86 species were characterized by its presence. The distribution of hydrocyanic acid in the plant was not uniform, even in species belonging to the same genus; in the majority of cases the greatest amount was in the bark. Nor was the acid always present in a given species.—*Sam F. Trelease.*

2073. KING, HAROLD. The isolation of muscarine, the potent principle of *Amanita muscaria*. Jour. Chem. Soc. [London] 121: 1743-1753. 1922.—Details are given of a method of isolating pure muscarine from fresh *A. muscaria* tissue. The distribution of muscarine in the various fractions obtained was determined by 2 methods of physiological assay: one consisted in observing the action of muscarine chloride on a loop of rabbit intestine, a dilution of 1 part in 600 millions giving an appreciable effect; the other in the effect on toad's heart, a distinct inhibition resulting at a dilution of 1 part in 75 millions. Attention is called to the difficulty of separating choline and muscarine. Other substances obtained from tissue of *A. muscaria* were ergosterol, 1-leucine, mannitol, and fumaric acid.—*F. E. Denny.*

2074. MELL, C. D. The early uses of the yaupon. Amer. Forestry 28: 531. 1922.—The author briefly discusses *Ilex vomitoria* and its uses in the preparation of a tea and as a diuretic.—*Chas. H. Otis.*

2075. SAYRE, L. E. Standards of purity for medicinal agents. Trans. Kansas. Acad. Sci. 30: 232-233. 1919/21 [1922].—"This paper is contributed largely to give information as to what is now in evidence so far as medicinal standards are concerned and what the new revision committee of the U. S. Pharmacopoeia (10th) will be obliged to face."—*F. C. Gates.*

2076. SIMONSEN, JOHN LIONEL. The constitution of the terpene present in the essential oil from *Andropogon jwarancusa* Jones. Jour. Chem. Soc. [London] 121: 2292-2299. 1922.

2077. SIMONSEN, JOHN LIONEL. The essential oil from the leaves of *Abies pindrow* Spach. Indian Forest Rec. 8⁵: 1-5. 1922.—Oil extracted from *A. pindrow* shows 70 per cent pinene, with other turpines and alcohols. As the oil is expensive to extract and has so small an amount of turpentine, it is not of commercial importance.—*E. N. Munns.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 1560, 1649, 1746, 1762, 1824, 1827, 1839, 1851, 1928, 1955, 2004, 2029, 2030, 2031, 2037, 2038, 2056, 2069, 2072, 2073, 2076, 2166)

GENERAL

2078. MOLISCH, HANS. *Pflanzenphysiologie als Theorie der Gärtnerei*. 3rd ed., 8 vo, xi + 326 p., 145 fig. Gustav Fischer: Jena, 1920.

DIFFUSION, PERMEABILITY

2079. BROWN, WILLIAM. On the preparation and use of collodion osmometers. *Ann. Botany* 36: 433-439. 1922.—A method is described of preparing thimble-shaped membranes of collodion for use as osmometers. They are accurate, easy to make and manipulate, and by treatment with alcohol of different strengths can be brought to any desired degree of permeability. The method of using them is also described and the results of experiments performed with them are given.—*W. P. Thompson*.

2080. TRÖNDLE, A. *Neue Untersuchungen über die Aufnahme von Stoffen in die Zelle*. [Cell absorption.] *Biochem. Zeitschr.* 112: 259-285. 1920.—Palisade cells of *Buxus sempervirens* and *Acer platanoides* absorbed no KCl or NaCl when narcotized by ether or chloral hydrate. At lower concentrations of the narcotics, slow absorption, as determined by plasmolysis, occurred. After treatment with dilute oxalic or hydrochloric acid, the palisade cells of *Buxus sempervirens* absorbed NaCl in proportion to the outer concentration instead of at a constant rate, as in the checks. *Spirogyra* (*S. majuscula* and *S. sp.*) cells absorbed quinine, caffeine, or piperidine, the product of outer concentration and the time required to precipitate the tannin present in the vacuole being a constant. In the presence of traces of acid no absorption occurred. Alkaloid bases, salts, and salts in the presence of dilute acid penetrated the cells in the same time when killed by chloroform.—*H. D. Hooker, Jr.*

WATER RELATIONS

2081. COUPIN, HENRI. *Détermination de l'optimum d'humidité du milieu extérieur chez les Oscillaires*. [The determination of the optimum humidity for the external medium of *Oscillarias*.] *Compt. Rend. Acad. Sci. Paris* 174: 822-824. 1922.—The author finds that the optimum humidity for the growth of this blue-green alga is that provided by a 1 per cent solution of gelatin.—*C. H. Farr*.

2082. SINGH, KHARAK. Development of root system of wheat in different kinds of soils and with different methods of watering. *Ann. Botany* 36: 353-361. 3 fig. 1922.—Specially planned experiments showed that wheat plants in pots grow better when watered from below than when watered from above. With light soil the difference is most marked in young plants; with heavy soils it becomes most conspicuous at later stages. Growth is best in pure sand over a layer of farm-yard manure. It is better in a mixture of 25 per cent sand and 75 per cent Rothamsted soil than in either a mixture of 50 per cent of each or pure Rothamsted soil.—*W. P. Thompson*.

MINERAL NUTRIENTS AND SALT RELATIONS

2083. GUILLEMIN, MADELEINE, and W. P. LARSON. The relation between the fixed and free salts of bacteria. *Jour. Infect. Diseases* 31: 344-355. 1922.—The diffusion of salts out of the dead cells of *B. coli* is demonstrated. The free salts are found to predominate over the fixed in the bacterial cells.—*R. V. Allison*.

2084. JONES, LINUS H., and JOHN W. SHIVE. Influence of wheat seedlings upon the hydrogen ion concentration of nutrient solutions. Bot. Gaz. 73: 391-400. 1922.—Solutions of Tottingham's series were used. Marked differences were found in the rates of reaction change. Those solutions resistant to change, indicating buffer action, were those with the highest volume-molecular proportions of soluble phosphate salts, though 1 exception to this was found. A tendency for the solutions to approach a common pH value (always through increase of the H-ion content) was observed. A solution modified by substituting $(\text{NH}_4)_2\text{SO}_4$ for KNO_3 in equivalent osmotic concentrations "has shown that the pH values of these solutions are not greatly altered by contact with the roots of young wheat plants between the ages of 4 and 5 weeks, the tendency always being toward a slight increase in the H-ion concentration of the solution during growth intervals of 3 or 4 days without renewal of the solutions. It is thus easily seen that for certain types of culture studies in which it is desirable to maintain the H-ion concentrations of the nutrient media within comparatively narrow variation limits, solutions of this kind possess marked advantages over those in which the H-ion concentrations are rapidly decreased by the action of the plants."—B. W. Wells.

2085. LESAGE, PIERRE. Étude des plantes salées, pendant la période où se produisent des anomalies. [Plants in hypertonic salt solutions, during the period of abnormal development.] Compt. Rend. Acad. Sci. Paris 174: 56-58. 1922.—In these further studies on the effect of different concentrations of sodium chlorid on the fruiting of *Lepidium sativum*, the author was able to grow plants to maturity in concentrations as high as 14 per cent; but the germination of the seed produced was very poor. The salt solution affects the absorption of water and ions, such as potassium. The seed of plants grown in cultures with high salt content are shorter and thicker than the controls. Sixty-five of 265 fruits of plants grown in high salt concentration showed 3-4 locules; only 1 out of 90 control plants had this abnormality. Little evidence is presented that this abnormality is inheritable. [See also Bot. Absts. 9, Entry 482.]—C. H. Farr.

2086. MASCHHAUPT, J. G. De samenstelling onzer cultuurgewassen in opeenvolgende groeiperioden. [The composition of crops in successive periods of growth.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 25: 131-139. 1921.—This paper includes results of investigations made to determine: (1) during what part of the growing period the plant obtains mainly nitrogen or phosphorus; (2) whether the amount of nitrogen and ash constituents in the harvested crops is the maximum present at any period during growth; and (3) whether at the end of vegetative growth these substances are returned to the soil.—The soil used was a poor sand, the plot was fertilized with 80 kgm. nitrogen as $(\text{NH}_4)_2\text{SO}_4$, 96 kgm. P_2O_5 as Thomas slag, and 210 kgm. K_2O in the form of "patent kali."—Potatoes were planted April 26, 1919, and harvests and analyses made on June 4 and 20, July 4 and 26, August 11 and 29. Leaves and tubers but no roots were analyzed.—The weight (dry) of the leaves rises until the end of July, then decreases in early August. A marked decrease in the second half of August was due to dying of foliage. Nitrogen in the leaves is very high in the beginning, and then decreases slowly; in the tubers the nitrogen content decreases between July 4 and 26, but no more after that. It increases in the leaves to the beginning of July and is then seemingly transferred to the tubers, as the total nitrogen (leaves and tubers) seems to be constant. P_2O_5 decreases very much in the leaves, while in the tubers it seems to remain constant after an initial decrease. The total amount increases at the end of the growing period. Potassium increases in the leaves to early July, afterwards decreasing; in tubers it decreases very much during July, but increases later. SO_3 increases in leaves to July 26 and decreases after August 11, the total SO_3 increasing to the end. The Cl data are similar to those on SO_3 . CaO in leaves decreases to July 4 or July 26, the total amount increasing between July 4 and July 26 and then remaining constant. The MgO content is changeable in the leaves and constant in the tubers, the total increasing somewhat.—It was found that at the end of the growing period there is in potatoes no loss in nitrogen and ash constituents. What is lost in the leaves is deposited in the tubers. The slight decrease in Na_2O and CaO is possibly due to loss of foliage near the end of August.—A German résumé concludes the paper.—Peter J. Klaphaak.

2087. SAUVAGEAU, C., et G. DENIGES. A propos des efflorescences du *Rhodomenia palmata*; présence d'un xylane chez les algues floridées. [The efflorescence of *Rhodomenia palmata*; the presence of xylane in the red algae.] Compt. Rend. Acad. Sci. Paris 174: 791-794. 1922.—The efflorescence of this alga is found to be due to KCl, but not to mannite or trehalose. [See also Bot. Absts 11, Entry 3020.]—C. H. Farr.

PHOTOSYNTHESIS

2088. STOKLASA, J. Die Bedeutung der Radioaktivität des Kaliums bei der Photosynthese. III. [The significance of the radioactivity of potassium in photosynthesis.] Biochem. Zeitschr. 108: 173-184. 1920.—Reasons are given for considering that magnesium has no relation to photosynthesis. Carbon assimilation is considered a decomposition of potassium bicarbonate under the influence of light to formic acid, oxygen, and potassium carbonate, and the further decomposition of formic acid to formaldehyde and oxygen. The β - and γ -rays of potassium are thought to be important in photosynthesis.—H. D. Hooker, Jr.

METABOLISM (GENERAL)

2089. BRIDEL, MARC. Sur la présence d'un glucoside à essence dans les tiges foliées et les racines du *Sedum Telephium* L. [On the presence of a glucoside in the leafy shoots and roots of *Sedum Telephium*.] Compt. Rend. Acad. Sci. Paris 174: 186-188. 1922.—The amount of reducing sugar in the extract is increased after treating with invertin, and still more if treated with emulsin. This is taken as evidence of the presence of a glucoside upon which these enzymes act. The physical and chemical properties of the glucoside are described.—C. H. Farr.

2090. CLARK, E. P. The structure of fucose. Jour. Biol. Chem. 54: 65-73. 1922.—Fucose was prepared from *Ascophyllum nodosum* by an improved method. Fucose ($C_6H_{12}O_6$) may be considered as a methyl pentose. The positions of the hydroxyl groups on carbon atoms 2, 3, and 4, heretofore determined by purely chemical means, have been verified by a study of the optical properties of preparations from fucose.—G. B. Rigg.

2091. COHEN, CLARA. Über die Bildung von Acetaldehyd bei den Umsetzungen von Zucker durch Pilze. [Acetaldehyde formation in sugar decomposition by fungi.] Biochem. Zeitschr. 112: 139-143. 1920.—The formation of acetaldehyde from glucose by *Aspergillus cellulosa*, *Monilia candida*, *Mucor racemosus*, *M. Rouxii*, and *Oidium lactis* was demonstrated by using disodium sulphite or calcium sulphite.—H. D. Hooker, Jr.

2092. COMBES, RAOUL. La recherche des pseudo-bases d'anthocyanidines dans les tissus végétaux. [The pseudo-bases of the anthocyanidines of plant tissues.] Compt. Rend. Acad. Sci. Paris 174: 58-61. 1922.—An attempt is made to establish the conclusion that the substances considered by Noack as pseudo-bases of anthocyanidines are really phlobatannins. The tissues employed were the leaves of *Ampelopsis hederacea*, of grapes, and of apples; also the pericarp of *Aesculus Hippocastanum*.—C. H. Farr.

2093. FÄRBER, E., und F. F. NORD. Die phytochemische Reduktion des Acetols zu optischaktivem Propylenglykol. [Phytochemical reduction of acetol to optically active propylene glycol.] Biochem. Zeitschr. 112: 313-323. 1920.—Acetol, which is optically inactive, was reduced by yeast to levorotatory propylene glycol.—H. D. Hooker, Jr.

2094. HADJOPOULOS, L. G. Complement fixation in typhoid fever. Jour. Infect. Diseases 31: 226-232. 1922.—The formation of complement-fixing bodies was observed as one of the earliest and most constant immune manifestations in the course of typhoid infection. The satisfactory application of the complement-fixation test in the diagnosis of the fever is described.—R. V. Allison.

2095. IRVINE, JAMES COLQUHOUN, and EDMUND LANGLEY HIRST. The constitution of polysaccharides. Part V. The yield of glucose from cotton cellulose. Jour. Chem. Soc. [London] 121: 1585-1591. 1922.—Careful methods, described in detail, were used, anhydrous cotton cellulose being first converted into cellulose triacetate, then into alpha- and beta-methylglucosides, then into glucose. "Considering the standard of purity in which the mixed methylglucosides were isolated, there can be no further doubt that cotton cellulose is composed entirely of glucose residues."—F. E. Denny.

2096. JOYNER, REGINALD ARTHUR. The viscosity of cellulose in cuprammonium hydroxide solution. Part I. The determination of the viscosity. Jour. Chem. Soc. [London] 121: 1511-1522. Fig. 1. 1922.—An apparatus was devised for dissolving cotton cellulose and measuring the viscosity by the falling-sphere method. Cuprammonium solutions of high cellulose-dissolving power were prepared by bubbling air through a mixture of clean copper turnings and strong ammonia. Adding about 1 gm. of sucrose per l. hastened the dissolution of the copper and protected the reagent against the loss of dissolved copper on standing. A study was made of the effect on the viscosity produced by varying the relative proportions of copper, ammonia, and cellulose. The most suitable proportion for viscosity measurements varied with the type of cotton, but for general use a solution containing 13 gm. of dissolved copper, 20 gm. of cellulose, and 200 gm. of ammonia per l. is recommended. With high copper concentration and low ammonia content cellulose is gelatinized and dissolves slowly. Large variations in viscosity values resulted from the difficulty in taking a representative sample of cotton.—F. E. Denny.

2097. OSBORNE, T. B., A. J. WAKEMAN, and C. S. LEAVENWORTH. The water-soluble constituents of the alfalfa plant. Jour. Biol. Chem. 53: 411-429. 1922.

2098. RICHARDSON, WILLIAM D. The vitamine doctrine and the oleomargarine industry. 16 p. Institute of Margarin Manufacturers: Washington, 1921.—In this paper there is presented a brief discussion of the vitamins and their occurrence. Emphasizing the variety of plant and animal products in which the fat-soluble vitamin (A) occurs, the author endeavors to show that "given an ordinary, every day, reasonable well balanced diet for the average man, woman or child, it does not make any difference from the dietary standpoint whether the individual eats oleomargarine or butter,"—B. M. Duggar.

2099. SAMEC, M., und H. HAERDTL. Studien über Pflanzenkolloide IX. Zur Kenntniss verschiedener Stärkearten. [Plant colloids IX. Starches.] Kolloidchem. Beih. 12: 281-300. 1920.—The authors used carefully prepared starches from potato, *Maranta arundinacea*, *Mannihot utilissima*, *Curcuma Zedcaria*, horse chestnut, wheat, *Oryza glutinosa*, maize, and rice, and found that all contain an electrodialytically precipitable, viscous portion that conducts electricity (A. Meyer's β -amylose; L. Maquenne's amylopectin) and a portion that is the opposite in all these respects (Maquenne's amylose). The relative amounts of these 2 are different in different starches, as are also the water content of the grain, the viscosity of the starch solution, and the rapidity with which diastase acts on the starch. All starches contain phosphorus, the variation in amount being paralleled by the electric conductivity of the electrodialyzed solution. The method of union or degree of saturation of the phosphoric acid varies, however. All starches react with alkalis and become more fluid as the temperature is raised.—H. E. Pulling.

2100. STOKLASA, J. Der Mechanismus der physiologischen Wirkung der Radiumemanation und der Radioaktivität des Kaliums auf die biochemischen Vorgänge bei den Wachstumsprocess der Pflanzen. II. [Mechanism of the action of radium and radioactive potassium on biochemical processes in plant growth.] Biochem. Zeitschr. 108: 140-172. 1920.—Under the influence of radium emanations for 5 days, 48.04 per cent of the total nitrogen was converted to amide nitrogen by proteolytic enzymes, as compared with 32.16 per cent under control conditions. Radium emanations stimulated the development and metabolism of many plants,

the dosage depending on the plant. Stimulation was produced by a weak dosage in all but potash plants, such as the sugar beet, in which growth was depressed. Tissues rich in potassium were found to be sensitive to radium emanations. This was found especially true of green tissues, etiolated leaves being deficient in potassium. The toxic action of radium is attributed to the products of augmented carbon assimilation. Radium exerted no toxic influence on the chlorophyll-free cells of bacteria, in spite of their being rich in potassium.—*H. D. Hooker, Jr.*

2101. WASICKY, RICHARD. Ein Beitrag zur Kenntnis der Rolle der Pflanzenglycoside. [The role of plant glucosides.] *Biochem. Zeitschr.* 113: 1-18. 1921.—Several samples of the isolated leaves and stems of *Digitalis purpurea* about 1 year old were placed separately in Knop's nutrient solution and in tap water. Some were exposed to sunlight and others kept in the dark for a varying period of time, at the end of which the effect produced upon glucosidal content was determined, using the biological method for assaying the digitalis glucosides. Experiments were also carried out to determine the action of the accompanying enzymes and to locate the glucosides in the leaves by microchemical reactions. The writer states that the quantity of the glucosides in digitalis follows the assimilation curve, being at its maximum at the time when assimilation is at its greatest intensity. He concludes that glucosides undoubtedly play an important part in regulating the turgidity of plant cells.—*J. M. Marañon.*

METABOLISM (NITROGEN RELATIONS)

2102. HOFFMAN, WALTER FRED, and ROSS AIKEN GORTNER. Sulfur in protein 1. Effect of acid hydrolysis upon cystine. *Jour. Amer. Chem. Soc.* 44: 341-361. 1922.

2103. JONES, D. B., C. E. F. GERSDORFF, C. O. JOHNS, and A. J. FINKS. The proteins of the lima bean, *Phaseolus lunatus*. *Jour. Biol. Chem.* 53: 231-240. 1922.—The lima bean meal used yielded 21.17 per cent of protein, consisting of 2 globulins and an albumin, all 3 containing tryptophane.—*G. B. Rigg.*

2104. VICKERY, H. B. The rate of hydrolysis of wheat gliadin. *Jour. Biol. Chem.* 53: 495-511. 1922.—Acid hydrolysis of this protein is a continuous process proceeding from first to last without marked interruption due to the existence of stable complexes, and is, therefore, clearly distinguished from enzymatic hydrolysis.—*G. B. Rigg.*

2105. WARBURG, O., und E. NEGELEIN. Über die Reduktion der Salpetersäure in grünen Zellen. [Nitric acid reduction in green cells.] *Biochem. Zeitschr.* 110: 66-115. 1920.—*Chlorella pyrenoides* Chick was transferred from Knop's solution to a solution of $\frac{N}{10}$ sodium nitrate- $\frac{N}{11}$ nitric acid, and nitrate reduction was studied under thermostatic conditions. Gas exchange was measured with the Haldane apparatus and also by measuring the difference in gas pressure between 2 vessels in 1 of which the evolved CO_2 was absorbed by 5 percent KOH. A Haldane-Barcroft gas manometer was used. NH_3 was determined by Nessler's colorimetric method and HNO_2 with α -naphthylamine sulphanilic acid. Nitrate reduction occurred in the dark, the CO_2 - O_2 ratio being 1.3:2.0. CO_2 equal to the O_2 consumption resulted from respiration, the excess CO_2 being produced by nitrate reduction in decreasing amounts over several hours. NH_3 was produced simultaneously in increasing amounts until 1 molecule was produced for every 2 of CO_2 according to the reaction: $\text{HNO}_3 + \text{H}_2\text{O} + 2\text{C}$ (in organic combination) = $\text{NH}_3 + 2\text{CO}_2 + 162,000$ cal. Until this equation is reached, part of the NH_3 is thought to be assimilated. Only 30 per cent of the energy evolved is available to the cell in the form of chemical energy. Nitrate reduction was 20 times as sensitive to HCN as carbon assimilation. This is thought to indicate that the 2 processes are independent and that catalytically active heavy metals participate in nitrate reduction. 0.013 per cent phenylurethan completely inhibited carbon assimilation, reduced the formation of extra CO_2 30 per cent and stimulated respiration. At low partial pressures of O_2 nitrous acid was formed, NH_3 production was decreased in proportion, and the cells were poisoned by the nitrite and died. HCN did not depress nitrite formation. When illuminated the cells evolved $2\frac{1}{2}$ -3 times as

much extra O_2 as extra CO_2 produced in the dark, and 2-3 times as much NH_3 . The reaction never reached the equation $HNO_3 + H_2O = NH_3 + 2O_2$ as nitrogen assimilation continued uninterrupted during illumination, producing an NH_3 deficit. Illumination increased nitrogen reduction but independently of carbon assimilation. When narcotized, illuminated cells gave off extra CO_2 . The stimulating effect of light is thought to result from increased absorption of nitric acid.—*H. D. Hooker, Jr.*

METABOLISM (ENZYMES, FERMENTATION)

2106. BIJL, PAUL A. VAN DER. Studies on some fungi and the deterioration of sugar. Union South Africa Dept. Agric. Sci. Bull. 18. 19 p. 1920.—The fungi studied are *Penicillium divaricatum*, strains of the *Aspergillus repens glaucus* group, strains of the *Penicillium luteum purpurogenum* series, *Aspergillus niger*, *A. terreus*, and *A. fumigatus*. The growth of these fungi was observed in sugar solutions of different densities and studies were made of the influence of acidity or alkalinity and of chlorides upon the inversion of sucrose by fungi, the hygroscopic nature of the decomposition products of dextrose, the influence of different moisture contents on the deterioration of refined sugar infected with fungi, the effect of partial sterilization by heat, and the effect of various disinfectants on the fungi.—The normal losses due to inversion in sucrose in mills can be attributed to (1) the enzyme invertase which is normally present in cane, and (2) the enzyme secreted by various microorganisms.—The inversion of sugar by microorganisms is influenced by temperature, the moisture present in the sugar, humidity of the atmosphere, exposure to infection by microorganisms, and hygroscopic non-sucrose substances present in raw sugar. All these factors can be controlled to a large extent.—*E. M. Doidge.*

2107. DAVISON, WILBURT C. Filterable "substance" antagonistic to dysentery and other organisms (d'Herelle's phenomenon, bacteriophage, bacteriolytic agent, bacteriolysant, etc.). Absts. Bact. 6: 159-177. 1922.—This is an extensive, analytical, and critical review of the literature which deals with the d'Herelle phenomenon, namely, that Berkefeld filtrates of stool cultures and of cultures from other sources kill and dissolve dysentery bacilli and other organisms. D'Herelle's idea that this agent is the living *Bacteriophagum intestinale* is rejected and it is concluded: that the phenomenon probably depends upon a bacteriolytic enzyme produced by bacteria; that the amount of this enzyme produced by a culture can be increased by external influences; that the action of these external influences is probably to favor the development of lysogenic organisms at the expense of non-lysogenic; that this enzyme not only dissolves organisms but also favors the multiplication of bacteria which produce this enzyme; and that it is highly improbable that this phenomenon represents a defense mechanism on the part of an animal against bacterial invasion.—The publications of 32 authors are noted in the bibliography.—*D. Reddick.*

2108. EFFRONT, JEAN. Sur les propriétés distinctives des amylases de différentes provenances. [On the distinctive properties of amylases from different sources.] Compt. Rend. Acad. Sci. Paris 174: 18-21. 1922.—A new method is employed in this study, namely, the coagulation of starch by iodine. Amylases were studied from 18 sources, including human and vegetable material. They are compared as to ability to liquefy and to saccharify starch expressed as grams per hour, and also as to the intensity with which they accomplish hydrolysis in the presence of an excess of diastase after 5 hours of optimum temperature. The amylases are found to vary much in these properties. The optimum temperature for liquefaction is also highly variable. The filtration of some of the amylases is found to increase their activity, possibly due to the adherence to the filter and consequent removal of certain colloidal substances which may have a retarding effect on the reaction.—*C. H. Farr.*

2109. HAAR, A. W. VAN DER. Die Entbehrlichkeit des Mangans für das Oxydasenmolekül bei der Züchtung von *Hedera helix*, und die Bertrandsche Mangantheorie der Oxydasen. [The superfluosity of manganese in the oxydase molecule produced by *Hedera helix* in culture, and Bertrand's manganese-oxidase theory.] Biochem. Zeitschr. 113: 19-28. 1921.—

Germinating and growing *Hedera helix* in nutrient culture solutions practically free from manganese, van der Haar obtained plants containing only 0.02 mgm. of manganese in 12.4 gm. of green weight. The ungerminated seed contained 0.001 mgm. manganese per seed. The 12.4 gm. was the weight of one plant, which showed a slight increase in manganese over that found in the seed. The oxidase obtained from these plants gave all the normal reactions characteristic of oxidase from plants growing under normal conditions. The writer concludes that Bertrand's manganese theory, according to which the oxidase is a manganese protein compound, is not applicable to the *Hedera* oxidase, which he thinks is to be considered as a glucoprotein compound.—*F. G. Gustafson.*

2110. IREDALE, THOMAS. The role of protective colloids in catalysis. Part II. Jour. Chem. Soc. [London] 121: 1536-1542. 1922.—This is a study of the effect of certain colloids in inhibiting the catalytic decomposition of H_2O_2 by colloidal platinum. Effectiveness was shown to be related to the method of preparation of the inhibitor. A comparison is made of 2 solutions of gelatin of the same concentration, 1 thought to consist of a large number of small particles, the other of a small number of large particles. The latter was always less effective as an inhibitor at low concentrations (0.000005 per cent) and not always at high (0.01 per cent). The "inhibition number" was defined as "that percentage of protective colloid which is just insufficient to inhibit catalytic action." Gelatin, egg-albumin, dextrin, and starch were effective in the order named. The same order holds for the Zsigmondy-gold-number coagulation-effect, and the 2 phenomena are thought to be related to the same property—"the capacity of the protective colloid for inhibiting further adsorption."—*F. E. Denny.*

2111. KÖHLER, E. Über Fermentbildung. [Enzyme formation.] Biochem. Zeitschr. 112: 236-254. 1920.—The production of zymogen and activation to zymase in yeast are stimulated independently; 5 per cent maltose retards the former and stimulates the latter; 5 per cent sucrose, glucose or fructose stimulates the former and retards the latter. Zymogen production is thought to occur in the outermost regions of the living substance.—*H. D. Hooker, Jr.*

2112. KÖHLER, E. Untersuchungen über den Gang der alkoholischen Gärung der Hefe. [The course of alcoholic fermentation by yeast.] Biochem. Zeitschr. 108: 235-243. 1920.—The rate of fermentation was measured by counting the bubbles of gas given off per minute. The course of fermentation was found to be irregular and dependent on the concentration of sugar. Increase in the concentration of alcohol during fermentation induced smaller rhythmic fluctuations in the rate of the reaction. Retardation and stimulation are thought to alternate during the course of fermentation.—*H. D. Hooker, Jr.*

2113. KÖHLER, E. Untersuchungen über den Ablauf der alkoholischen Gärung der Hefe. II. [The course of alcoholic fermentation by yeast.] Biochem. Zeitschr. 110: 128-132. 1920.—The larger rises and falls in the curve of alcoholic fermentation in response to changes in the concentration of sugar are characterized as "zig-zag phenomena."—*H. D. Hooker, Jr.*

2114. MICHAELIS, L., und M. ROTHSTEIN. Zur Theorie der Invertasewirkung. [Theory of invertase action.] Biochem. Zeitschr. 110: 217-233. 1920.—Invertase acting on 2-40 per cent sucrose in acetate or phosphate buffer solutions of various H-ion concentrations indicated that invertase combined with 1 molecule of sucrose to form an acid with dissociation constant of 3×10^{-7} . Under the experimental conditions (low salt content of the solutions and absence of marked colloid precipitants) the acid appeared molecularly dispersed and dissociated. The undissociated molecules decomposed spontaneously into the products of the enzymatic reaction. The anions were stable. This is thought to explain the effect of pH values from 3.5 to alkalinity on invertase activity.—*H. D. Hooker, Jr.*

2115. MORAN, THOMAS, and WILLIAM CUDMORE McCULLAGH LEWIS. Studies in catalysis. Part XVI. The inversion of sucrose by hydrogen ion. Jour. Chem. Soc. [London] 121: 1613-

1624. 1922.—H-ion concentrations and inversion-velocity constants were measured. These data, together with values for the viscosity of the solution and for the osmotic and vapor pressure of sucrose, permitted the authors to suggest a mechanism of the inversion process. Two consecutive reactions are involved. The activity of the H-ion was markedly increased in the presence of sucrose.—*F. E. Denny.*

2116. NEMEC, A. *Über Urikase im Samenorganismus.* [Uricase in seed.] *Biochem. Zeitschr.* 112: 286-290. 1920.—Five gm. soy-bean meal added to 100 cc. 0.3 per cent potassium urate and 5 cc. toluol decomposed the uric acid to NH_3 and CO_2 at 35°C . The enzyme activity was greater in the presence of atmospheric O_2 .—*H. D. Hooker, Jr.*

2117. NEUBERG, C., und M. SANDBERG. *Weitere Mitteilungen über chemisch definierte Katalysatoren der alkoholischen Gärung.* [Chemically defined catalyzers of alcoholic fermentation.] *Biochem. Zeitschr.* 109: 290-329. 1920.—Experiments with 82 substances including metallic as well as organic compounds showed that all reducing substances stimulated alcoholic fermentation by living yeast cells and by enzyme preparations. This is thought to show a relation between the activation of fermentation and deoxidation.—*H. D. Hooker, Jr.*

2118. NEUBERG, C., und W. URSUM. *Die dritte Vergärungsform des Zuckers als allgemeine Folge der Dismutationswirkung anorganischer und organischer Alkalisatoren.* [The third type of sugar fermentation as a general result of "dismutation" by inorganic or organic compounds producing an alkaline reaction.] *Biochem. Zeitschr.* 110: 193-215. 1920.—Substances such as ammonium bicarbonate, potassium pyrophosphate, etc., that tend to produce an alkaline reaction in solution induced the fermentation of sucrose to acetic acid, alcohol, carbon dioxide, and glycerol.—*H. D. Hooker, Jr.*

2119. PETERSON, W. H., E. B. FRED, and J. A. ANDERSON. *The fermentation of hexoses and related compounds by certain pentose-fermenting bacteria.* *Jour. Biol. Chem.* 53: 111-123. 1922.—This new group of pentose-fermenters converts glucose, fructose, lactose, raffinose, and melezitose almost quantitatively into lactic acid.—*G. B. Rigg.*

2120. PETERSON, W. H., E. B. FRED, and E. G. SCHMIDT. *The fermentation of pentoses by molds.* *Jour. Biol. Chem.* 54: 19-34. 1922.—Twenty-five species, representing *Aspergillus*, *Penicillium*, and *Mucor*, were studied, 16 of which fermented pentoses (xylose and arabinose) with rapidity. Most of the remaining 9 cultures grew slowly, although 3 or 4 produced only a few mycelial threads. The best fermenters were found among species of *Aspergillus* and *Penicillium*, although a number of molds of these types only slowly attacked the pentoses. The *Mucors*, *Rhizopus nigricans*, and *Cunninghamella* were also found to be very slow fermenters. From these results it is suggested that pentoses might be of considerable value in the separation and classification of fungi.—*G. B. Rigg.*

2121. RONA, P. *Über die Wirksamkeit der Fermente unter abnormalen Bedingungen und über die angebliche Aldehydnatur der Enzyme.* [Enzyme activity under abnormal conditions and the reputed aldehyde character of enzymes.] *Biochem. Zeitschr.* 109: 279-289. 1920.—The enzymes pepsin, trypsin, amylase, emulsin, invertase, and maltase retained their hydrolytic activity in the presence of sodium bisulphite, hydroxylamin, benzolsulphhydroxamic acid, disodium sulphite, potassium cyanide, and phenylhydrazine,—reagents that react with aldehydes,—provided the H-ion concentration was regulated. This is thought to disprove the aldehyde character of enzymes.—*H. D. Hooker, Jr.*

2122. RONA, P., und P. GRÖRGY. *Zur Kenntnis der Urease.* *Zugleich ein Beitrag zum Studium der Giftwirkungen.* [Urease. A study of toxicity.] *Biochem. Zeitschr.* 111: 115-133. 1920.—The optimum pH value of 7.3-7.5 for soy-bean urease activity was confirmed. Acceleration of urease action by blood serum occurred only in prolonged experiments. No acceleration by amino-acids or retardation by H_2O or NaCl was detected. Inhibition of urease and lipase by various arsenic compounds was investigated.—*H. D. Hooker, Jr.*

ORGANISM AS A WHOLE

2123. FITCH, C. P. The cultivation of *Bacterium abortus* Bang. Jour. Infect. Diseases 31: 233-236. 1922.—The use of horse serum-beef infusion agar with a pH of 6.8-7.2 and an atmosphere of 10 per cent CO₂ or H₂ is described as giving most satisfactory results in the cultivation of this organism.—R. V. Allison.

2124. GALE, G. W. A preliminary account of some investigations on leaf-aeration in certain Natal plants. South African Jour. Sci. 18: 153-155. 1921.—The quantitative results given illustrate and confirm an important ecological principle, namely, that pioneer types are more variable in their physiological functions than subsequent types, and for that reason able to adapt themselves to the more varied conditions presented by the habitat during early stages in plant succession.—E. P. Phillips.

2125. LOTKA, ALFRED J. Contribution to the energetics of evolution. Proc. Nation. Acad. Sci. [U. S. A.] 8: 147-151. 1922.—“In every instance considered, natural selection will so operate as to increase the total mass of the organic system, to increase the rate of circulation of matter through the system, and to increase the total energy flux through the system, so long as there is presented an unutilized residue of matter and available energy.” Evolution tends to produce a maximum energy flux, provided the hereditary variations available for selection include some that tend toward increase of energy flux.—Howard B. Frost.

2126. LOTKA, ALFRED J. Natural selection as a physical principle. Proc. Nation. Acad. Sci. [U. S. A.] 8: 151-154. 1922.—The 1st and 2nd laws of thermodynamics do not, in general, completely determine the course of physical events, either in the presence or in the absence of life. Other principles must be added to explain fully what really occurs. One such principle is that of natural selection, or of “the persistence of stable forms.” The units of organic evolution are “energy transformers subject to irreversible collisions of peculiar type—collisions in which trigger action is a dominant feature.” Natural selection “functions, as it were, as a 3rd law of thermodynamics (or a 4th, if the 3rd place be given to the Nernst principle).” —Howard B. Frost.

2127. PEROTTI, R. Per la conoscenza dei rapporti fra microrganismi e pianta verde. [The relation between microorganisms and higher plants.] [Abstract.] Boll. Mens. R. Staz. Patol. Veg. 2: 96-99. 1921.

2128. VERZAR, F., und J. BÖGEL. Weitere Untersuchungen über Stoffwechselregulierung bei Bakterien. [Regulation of metabolism in bacteria.] Biochem. Zeitschr. 108: 207-219. 1920.—*Bacillus coli communis*, *B. paratyphi* B, and *B. proteus* X19 produced maximum acidity in 1 per cent glucose. At lower concentrations alkali formation followed the initial acid production. The titratable acidity at the above mentioned maximum and the threshold concentration at which alkali formation began were highest in *B. coli*. *Streptococcus haemolyticus* never produced alkali. The ultimate acidity was independent of the initial reaction. Gas formation was synchronous with acid production in *B. coli*; oxygen consumption as measured by Bancroft's apparatus was greater during alkali formation. No connection was found between movement and gas formation in *B. paratyphi*. Ethyl and methyl alcohol, chloroform, and formaldehyde retarded gas exchange in *B. coli* at concentrations much below the inhibiting dose. The toxicity of the alcohols was peculiar in that it was summated with that of the acids formed from glucose, so that a lower maximum acidity was reached in the presence of alcohol. Methyl alcohol was less toxic than ethyl.—II. D. Hooker, Jr.

GROWTH, DEVELOPMENT

2129. BROWN, WILLIAM. On the germination of fungi at various temperatures and in various concentrations of oxygen and of carbon dioxide. Ann. Botany 36: 257-283. 4 fig. 1922.—This paper describes experiments which had for their object the examination of the

behavior of certain storage rot fungi under the conditions prevailing in the practice of fruit storage. The fungi used were: *Botrytis cinerea*, *B. parasitica*, *Mucor* sp., *Rhizopus nigricans*, *Penicillium glaucum*, *Monilia cinerea*, *Fusarium* sp., *Phoma roseola*, *Alternaria Grossulariae*, and *Sphaeropsis malorum*. A series of experiments was first carried out dealing with the effect on germination of various concentrations of CO₂ and O₂. It was found that within wide limits O₂ had little effect on the germination and growth of these fungi. The latter processes were retarded by CO₂ and this retardation was more marked the lower the temperature and the weaker the nutrient in which the fungus spores were sown, and, to a less degree, it was more marked the greater the density of the medium. The author discusses the practical considerations which arise from his work. He concludes that the experimental results indicate that the gas storage method is most effectively used in combination with the ordinary cold storage method, and that it will give the best results when no attack of the fruit has begun previous to storage, and when conditions are such that a minimum of nutrients is available to fungous spores on the surface of the fruit. A review is given of the most recent and important papers dealing with the effect of temperatures on the growth of fruit-rot organisms.—W. P. Fraser.

2130. RIPPEL, AUGUST. Über die Wachstumskurve der Pflanzen. [Regarding the growth curves of plants.] Landw. Versuchssta. 97: 357-380. 1921.—This is a further discussion [see Bot. Absts. 9, Entry 519] of the applicability of the growth curves of Robertson and Mitscherlich [see Bot. Absts. 9, Entries 517, 518].—B. M. Duggar.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

2131. ZAEFFEL, EDGAR. Sur le mécanisme de l'orientation des feuilles. [On the mechanism of orientation of leaves.] Compt. Rend. Acad. Sci. Paris 174: 119-120. 1922.—By splitting the petiole lengthwise and noting the curvature and torsion of the half petiole in either air or water, it is concluded that the petiole adjusts the orientation of the blade by differences in the water content of the various parts.—C. H. Farr.

GERMINATION, RENEWAL OF ACTIVITY

2132. LESAGE, PIERRE. Sur la détermination de la faculté germinative autrement que par la germination des graines. [The determination of the germinating power of seed in some other way than by germinating them.] Compt. Rend. Acad. Sci. Paris 174: 766-767. 1922.—The viability, that is the germinating power, of the seeds of *Lepidium sativum*, it was found, can be determined by the use of 20 different solutions of potash. Those seeds which become colored in a 2⁻⁵N to $\frac{1}{2}$ 2⁻⁹N solution will not germinate. Those which remain uncolored in these solutions are viable and will germinate. The color appears within 4 hours.—C. H. Farr.

2133. NEMEC, ANTONIN, et FRANTISEK DUCHON. Sur une méthode indicatrice permettant d'évaluer la vitalité des semences par voie biochimique. [A biochemical method permitting the evaluation of the viability of seed.] Compt. Rend. Acad. Sci. Paris 174: 632-634. 1922.—The method consists in determining the activity of the catalase. This is accomplished by finding the amount of O₂ liberated from H₂O₂. This is found to be in direct proportion to the germinating power. Oats which will not germinate at all may liberate as low as 4.1; those which have 100 per cent germination liberate about 78.6; and those with 66 per cent germination liberate 57.1. The same is true with peas, although in this case the proportion corresponds even more closely than with oats.—C. H. Farr.

RADIANT ENERGY RELATIONS

2134. GORIS, A., et H. DELUARD. Influence des radiations solaires sur la culture de la belladone et la formation des alcaloïdes dans les feuilles. [The influence of solar radiations on the culture of belladonna and the formation of alkaloids in leaves.] Compt. Rend. Acad. Sci. Paris 174: 188-190. 1922.—Experiments were run in triplicate. Set A, in the sunlight, continuously yielded 0.65 per cent alkaloid for the 1st crop and 0.52 per cent for the 2nd. Set B, in the shade for 6 weeks, and in the sun for 6 weeks, yielded only 1 crop of 0.42 per cent.

Set C, in the shade throughout the growing season, yielded nearly as much as B. It is concluded that plants growing in the sun will furnish 7-8 times the amount of alkaloid as those grown in the shade.—*C. H. Farr.*

TOXIC AGENTS

2135. ACEL, D. Über die oligodynamische Wirkung der Metalle. [The oligodynamic action of metals.] *Biochem. Zeitschr.* 112: 23-26. 1920.—The oligodynamic action of water in contact with metallic silver was shown to be due to the presence of silver compounds in solution which formed silver sulphide with ammonium sulphide after evaporation of the water. Water treated with ammonium sulphide lost its oligodynamic properties.—*H. D. Hooker, Jr.*

2136. CONOVER, JOHN R. The determination of the value of certain soaps in disinfecting wall and floor surfaces. *Amer. Jour. Public Health* 12: 602-605. 1922.

2137. DOERR, R. Zur Oligodynamie des Silbers. II. [Oligodynamics of silver.] *Biochem. Zeitschr.* 107: 207-218. 1920.—The bactericidal action of metallic silver was destroyed by previous heating of the metal, by repeated boiling in distilled water, or by prolonged imbedding in agar. It was reactivated by contact with strongly dissociated acids in dilute solution. The oligodynamic chemical was dialyzable, though at a different rate from silver oxide under certain conditions. No such difference was observed in the diffusibility through agar. In agar, the sterile zone about metallic silver, or silver oxide or nitrate, was surrounded by 2 concentric rings where bacterial colonies developed to unusual size. Similar zones (hemolytic) occurred about silver in blood-agar and this action could be destroyed by the same means as the bactericidal action, which is thought to be due to water-soluble silver compounds formed at the surface of the metal.—*H. D. Hooker, Jr.*

2138. DOERR, R. Zur Oligodynamie des Silbers. III. Mitteilung. [The oligodynamics of silver. III.] *Biochem. Zeitschr.* 113: 58-69. 1921.—On heating metallic silver until the edges begin to melt it loses its bactericidal property. On remaining in air this toxic property is regained, but not if kept under liquid paraffin. By further experiments the writer shows that a given area of metallic silver possesses a definite amount of toxic substance, and that if this is dissolved the silver is no longer toxic until the metal again has been exposed to air for some time. Thus an area of 200 square cm. gives off twice as much toxic substance as does an area of 100 square cm. From these experiments the writer draws the conclusion that the silver as such is not the toxic substance (oligodynamic property), but that the bactericidal property or substance is a soluble compound of silver formed in the presence of air, probably Ag_2O . In still further experiments the writer found that typhus bacteria were less influenced by the bactericidal action of silver than were the coli bacteria. Thus when grown on a solid medium with a piece of imbedded metallic silver an area 1.5 mm. wide surrounding the silver remained free from bacteria; in the next 1.5 mm.-zone there were only typhus bacteria; beyond this both typhus and the coli bacteria grew. By adding milk sugar to the agar this condition was further emphasized. Paratyphus bacteria of group A or B behaved like the typhus bacteria. The author thinks that by further work a method for separating these as well as other bacteria might be developed.—*F. G. Gustafson.*

2139. JACKSON, LLOYD E. The bacterial action of dry cleaning. *Amer. Jour. Public Health* 12: 507-509. 1922.—The "dry-cleaning" process, when properly conducted, has a very high and hygienically satisfactory bactericidal efficiency.—*C. A. Ludwig.*

2140. JULIANELLE, LOUIS A. Studies of hemolytic staphylococci. *Jour. Infect. Diseases* 31: 256-284. 1922.—Staphylococci were observed to produce a hemolytic substance in broth about the 6th day with a maximum at the 9th or 10th, disappearing on the 13th to 16th day. The nature and activity of the substance is described and it is thought to be associated with proteolysis and perhaps autolysis.—*R. V. Allison.*

2141. KAPPEN, H. **Über die Aziditätsformen des Bodens und ihre pflanzenphysiologische Bedeutung.** [The forms of soil acidity and their significance in relation to plant physiology.] Landw. Versuchssta. 96: 277-307. 1920.—The author discusses 3 characteristic forms of soil acidity. The 1st is exhibited by merely shaking the soil with water and determining the acid content by titration. This is due to free acids and acid salts. The 2nd is that type obtained by treating the soil with solutions of true neutral salts. This was originally taken to indicate the existence of humic acids but it is now known that such acidity is in part due to the occurrence of mineral acids in the extract. This phenomenon is now explained by adsorption or ion exchange, resulting from the interchange of ions between the neutral salts and certain aluminium and iron compounds which exist as colloidal constituents of the soil. The 3rd form of acidity is that induced by the capacity of the soil to dissociate such salts as consist of a strong base and a weak acid. The salts of this nature are characterized by hydrolysis in water. In the soil a part of the base is adsorbed and the corresponding acid is set free. This can be designated hydrolytic acidity. Throughout the paper the relation of humus type and content to the production of acidity is discussed, in particular the physiological significance of the 3rd form of acidity. In general the latter is considered to be uninjurious. With special reference to the importance of humic acids in respect to the growing plant, it is stated that the low solubility of these substances renders them of little consequence in soil acidity. They constitute, therefore, an extremely small part of the 1st form of acidity and likewise of the 2nd type, since in the latter case these acids do not affect neutral salts. In consequence, humic acids may be considered only in the 3rd category of acidity, that is, with hydrolytic acidity, in which category, however, they may not be regarded as injurious to plant growth. In the application of lime to soil it is held that the least effect is that of its action upon the humic acids.—B. M. Duggar.

2142. MACINNES, JEAN. **The growth of the wheat scab organism in relation to hydrogen ion concentration.** Phytopathology 12: 290-294. Fig. 1. 1922.—A species of *Fusarium* isolated from scabby wheat was grown in a modified Czapek's solution plus a mixed buffer solution. The H-ion concentration was varied by the addition of increasing amounts of NaOH. The organism grew at all concentrations between pH 3 and pH 11.7. This range is decidedly wider than for any fungus previously studied; and, considering the large number of hosts attacked by this fungus, its tolerance of acid and alkaline media may be significant.—B. B. Higgins.

2143. PLANTEFOL, L. **Sur le toxicité de divers phénols nitrés pour le *Sterigmatocystis nigra*.** [The toxicity of various nitrogenous phenols towards *Sterigmatocystis nigra*.] Compt. Rend. Acad. Sci. Paris 174: 123-126. 1922.—A study is reported on the germination and growth of *Sterigmatocystis nigra* in ortho-, meta-, para nitrophenol; 1, 2, 4—dinitrophenol; and 1, 2, 4, 6-trinitrophenol. It is found that the nitrophenols are more toxic than phenol. The ortho-mononitrophenol is the least toxic of the mono- group; and the para- is the most toxic. The dinitrophenol is much more toxic than any of the mono- types. The trinitrophenol has a degree of toxicity like the mono- compounds.—C. H. Farr.

2144. PLOTHO, O. VON. **Der Einfluss der kolloidalen Metallösungen nach Übertragung des Pilzmycels aus verschiedenen Nährsubstraten.** [The influence of metals in colloidal solution after transfer of the mycelium from various nutrient solutions.] Biochem. Zeitschr. 110: 33-59. 1920.—The fixation of colloidal metals by the plant membrane occurred in the absence of organic colloids, but when the amount was insufficient to prevent all fixation, storage of the metal was inversely proportional to the amount of organic colloid. Since gold could be prepared in colloid solution without organic protective colloids, gold storage readily occurred. Silver and copper required protective colloids and in undiluted solutions there was no fixation. On dilution the degree of protection was reduced and eventually some silver and copper fixation occurred. Storage occurred when the charge on the membrane particles was positive, as in acid solution, the charge on the particles of colloidal metal being negative under all conditions. Hence, storage was possible only by those organisms that tended to

make the solution acid. By regulating the acidity of the hydrosol, storage could be regulated. Retardation of growth never occurred in colloidal gold solutions, but it appeared in colloidal silver and copper solutions and the smaller the colloid particles the greater the retardation. The resistance of the organisms varied, being less in *Aspergillus* than in other fungi and greater in *Bacillus Brassicae* than in *B. megatherium*. The toxicity of silver and copper was evident in delayed germination and conidia development, in swellings of the membrane, in the development of giant cells, in bendings and thickenings of the mycelium and of the membrane, and in modification of the conidiophores.—*H. D. Hooker, Jr.*

2145. RONA, P., und H. PETOW. Beiträge zum Studium der Giftwirkung. Versuche über die Giftwirkung des Thiodiglykols und seine Derivate an Sojabohnenurease. [The toxic action of thiodiglycol and its derivatives on soy-bean urease.] Biochem. Zeitschr. 111: 143-165. 1920.—Thiodiglycol was not toxic to urease. Thiodiglycol acetate and sulphonate do not affect the H-ion concentration; the former is not toxic, the latter is to a moderate degree. The dichlordiethyl sulphide increases the H-ion concentration and completely inhibits urease activity when present in small amounts. It retards urease activity slightly when the H-ion concentration is regulated. The tetrachlordiethyl sulphide increases H-ion concentration and inhibits urease activity even when the reaction is regulated.—*H. D. Hooker, Jr.*

2146. SCHNABEL, A. Über die Bestimmung zell- und keimschädigender Substanzen in dünnen Lösungen auf biologischem Wege. (I. Mitteilung: Optochin.) [Biological determination of optochin in dilute solutions.] Biochem. Zeitschr. 108: 258-278. 1920.—One part of optochin in a million or more could be determined by the effect on the reduction of methylene blue by pneumococci. The ultimate dilution that could be determined was a function of time, temperature, and number of bacteria. At room temperature 1 part in a billion could be detected qualitatively. Quantitative data were best obtained at 37°C.—*H. D. Hooker, Jr.*

2147. WALKER, W. F. The treatment of swimming pool water with ultraviolet rays. Amer. Jour. Public Health 12: 320-325. 1922.—Ultraviolet rays proved effective for keeping bacterial contamination in a swimming pool reduced to a low point.—*C. A. Ludwig.*

ELECTRICITY AND MECHANICAL AGENTS

2148. SZENT-GYÖRGYI, A. VON. Kataphoreseversuche an Kleinlebewesen. Studien über Eiweissreaktionen. III. [Cataphoresis experiments on micro-organisms. Studies on protein reaction. III.] Biochem. Zeitschr. 113: 29-35. 1921.—The writer found that in general bacteria migrated toward the anode, while some trypanosomes migrated toward the anode and others toward the cathode. He found that morphologically there is no difference between organisms that migrate to opposite poles. In these experiments the writer used a potential difference of 100 volts, the organisms being suspended in isotonic sugar solution, Ringer's solution (without the bicarbonate), or in a mixture of 3:1 of the 2. All solutions were kept at pH 7.0 (regulated with phosphate buffers).—*F. G. Gustafson.*

MISCELLANEOUS

2149. CHAMBERS, ROBERT. A new micromanipulator and methods for the isolation of a single bacterium and the manipulation of living cells. Jour. Infect. Diseases 31: 334-343. 1922.—The advantages of the instrument over those in use are presented and its structure indicated diagrammatically and by photograph. [See also following entry].—*R. V. Allison.*

2150. KAHN, MORTON C. Chambers' micromanipulator for the isolation of a single bacterium. Jour. Infect. Diseases 31: 344-348. 1922.—This is a discussion of advantages and manipulation of the instrument [see preceding entry].—*R. V. Allison.*

2151. SHEPPARD, S. E., and F. A. ELLIOTT. The drying and swelling of gelatine. Preliminary note. Jour. Amer. Chem. Soc. 44: 373-379. 1922.

SOIL SCIENCE

A. G. McCall, *Editor*

(See also in this issue Entries 1534, 1542, 1543, 1545, 1554, 1560, 1567, 1569, 1570, 1571, 1591, 1592, 1593, 1594, 1595, 1596, 1608, 1611, 1723, 1725, 1836, 1840, 1843, 1878, 1891, 1910, 2082)

2152. ANONYMOUS. An outline of the uses of lime. Nation. Lime Assoc. Pamphlet 251. 8 p. 1922.

2153. ANONYMOUS. Eine einfache Methode zur Bestimmung des Säuregrades in Boden. [A simple method for determining the acidity of soils.] Mitteil. Deutsch. Landw. Ges. 37: 461-462. 1922.—A paper (title not given) by J. HISSINK, in Veldbode No. 1018, is reviewed. The work of Hissink was based on the method of Comber described in Jour. Agric. Sci. 10: 420-424. 1920.—A. J. Pieters.

2154. ANONYMOUS. Recent changes in artificial fertilizers. Agric. Gaz. New South Wales 33: 629-630. 1922.—The article discusses production changes which have come about during the past several years. These are most noticeable among nitrogenous fertilizers. Of these there are at least 7 recent kinds and much experimental work is necessary before these fertilizers can be used to best advantage.—L. R. Waldron.

2155. ANONYMOUS. The living soil. [Rev. of: FRANCÉ, R. H. Das Edaphon. Untersuchungen zur Ökologie der bodenbewohnenden Mikroorganismen. (Ecology of soil organisms.) 99 p. Franck'sche Verlagsbuchhandlung: Stuttgart, 1921.] Nature 110: 206-207. 1922.—The author coined the term "Edaphon" to cover all forms of life in the soil. He has performed a real service in bringing together scattered material, but has omitted reference to much recent work and perhaps over-emphasized the importance of soil organisms.—O. A. Stevens.

2156. BRAUND, H. J. The soils of the Murrumbidgee irrigation areas. How to develop their capacity for fruit production. Agric. Gaz. New South Wales 33: 631-638. 1922.—The physical structure of the soil is discussed and the total amount of plant food per acre to a depth of 4 feet is given. It is pointed out that when physical and chemical conditions in a soil are favorable for optimum plant growth, the biological factor readily adjusts itself. In certain of these soils it was found that the sub-strata were of single grain formation, preventing proper root penetration. Suggested methods for bringing about a crumb structure of soil in the sub-soil are discussed. Growing *Melilotus alba* in conjunction with deep application of gypsum is the method recommended.—L. R. Waldron.

2157. DEUSS, J. J. B. Groenbemesters in theetuinien. [Green manures in tea gardens.] De Thee 2: 50-51. 1921.—The tea experiment station in Java has recommended the planting of legumes in the tea gardens, but the planters have been slow to accept the idea. Experience with *Tephrosia* for soil improvement and partial control of weed grasses is described. If the legume is properly placed and pruned it does not suppress the tea.—Carl Hartley.

2158. DEUSS, J. J. B. Uitwassching en kalkbemesting. [Leaching and lime fertilizing.] De Thee 1: 107-109. 1920.—The author expresses disapproval of a proposal to dig catch basins in tea gardens to decrease erosion. In the tea regions of West Java the rainfall exceeds evaporation. There is too much tendency to leaching, even soils on limestone being deficient in the lime required for the best development of tea. A system should be used which takes off surplus rainwater, rather than one that retains it.—Carl Hartley.

2159. DEUSS, J. J. B. Zand-, leem- en kleigronden. [Sand, loam, and clay soils.] De Thee 2: 48-50. 1921.—A popular discussion is presented of the distinguishing characters of these soil types. Java tea is mainly grown on loam, the clay soils giving poor results.—Carl Hartley.

2160. GUTHRIE, F. B. The tick bean as green-manure. *Agric. Gaz. New South Wales* 33: 751. 1922.—An analysis of tick bean (*Vicia faba*) grown under irrigation showed that 98 pounds of nitrogen, 26 of phosphoric acid, and 127 of potash are added to each acre of soil when the crop is plowed under green.—*L. R. Waldron*.

2161. HUDIG, J., en C. MEIJER. De beteekenis van "Tetrafosfaat" als meststof. [The importance of tetraphosphate as fertilizer.] *Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta.* 25: 140-159. *Pl.* 1-8. 1921.—This fertilizer is made from natural phosphates by crushing and heating. From experimental results the following conclusions are drawn: The tetraphosphate functioned best on acid soils but very seldom surpassed superphosphate. Whenever it gave better results it was due to a greater acidity of the soil not favorable for superphosphate. Some acid soils in Netherlands (mostly sand) can be fertilized to advantage with either tetraphosphate or natural phosphates.—*Peter J. Klaphaak*.

2162. KUFFNER, KARL. Zur Phosphorsäurefrage. [On the question of phosphoric acid.] *Mitteil. Deutsch. Landw. Ges.* 37: 512-513. 1922.—The author points out that on some soils, rich in phosphate plants may suffer from phosphate hunger. He gives some data to show that such cases occur when the ratio of magnesium to calcium is wider than 1 to 2.5. When calcium exceeds this proportionate amount the phosphate combines into the insoluble tricalcium phosphate.—*A. J. Pieters*.

2163. LIGTENBERG, J. F. Grondwaterstand, capillariteit en verdamping. [Height of ground water, capillarity, and transpiration.] *Cultura* 34: 262-270. 1922.—A general consideration of the physics of the soil as worked out by Wollny, King, Versluijs, and others is presented. The writer brings together these results as well as his own in connection with the future relation of the IJssel Lake to the height of the ground water of the province of Friesland.—*J. C. Th. Uphof*.

2164. NOSTITZ, A. Über die Bedeutung des austauschbaren Bodenkalkiums für die Pflanzenernährung. [The meaning of exchangeable soil potash in plant nutrition.] *Jour. Landw.* 70: 45-72. 1920.—An experiment with Rothenburger, Bayreuther, and Augsburg soils is reported.—*F. M. Schertz*.

2165. OSUGI, S., and N. SOYAMA. On the change of soil-reaction by manuring. *Ber. Ohara Inst. Landw. Forsch.* 2: 79-93. 1921.—A progress report is made on the effect of various fertilizers on the H-ion concentration of field soils on which barley and rice were grown. The effect of the alkaline reaction of lime, lime-nitrogen, and wood ashes on the barley soil was distinct. The soil from the paddy rice field showed an alkaline reaction which resembled that of the irrigation water.—*H. S. Reed*.

2166. PETIT, A. A propos du "reveil de la terre arable." [Concerning the washing of fertile soil.] *Compt. Rend. Acad. Sci. Paris* 174: 1033-1034. 1922.—A summary is made of an article published by the author in 1909, in which data were presented which have been more recently confirmed by Lumière [see *Bot. Absts.* 11, Entry 3153]. A beneficial effect upon seed germination is indicated following washing the soil with distilled water.—*C. H. Farr*.

2167. VEIL, C. Relation entre l'indice de chlore et la teneur en azote de la terre végétale. [The relation between the index of chlorine and the nitrogen content of the soil.] *Compt. Rend. Acad. Sci. Paris* 174: 317-319. 1922.—The author reports a study to determine with what precision the nitrogen content of the soil can be determined by the loss of active chlorine from sodium hypochloride. Tests were made with various soils from 5 localities. A soil rich in nitrogen has a high chlorine index. In very rich soils in which the nitrogen content was found to be higher than 0.4 per cent the chlorine index ran higher than 30. In poor soils with a nitrogen content of less than 0.1 per cent, the chlorine index is 7-12. If the nitrogen content is between 0.1 and 0.2 per cent the chlorine index is 15-17.—*C. H. Farr*.

2168. WILLIAMS, C. O. Apparent infertility of the soil around trees. Jour. Dept. Agric. Union South Africa 5: 254-258. 1922.—From experiments carried out to test the moisture content of the soil around trees the conclusion is drawn that the apparent infertility is due to the absorption of the moisture by the ramified roots of the trees.—*L. J. Goldblatt.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 1532, 1599, 1635, 1647, 1652, 1679, 1725, 1749, 1863, 1894, 1909, 1947, 2070)

GENERAL

2169. HAINES, H. H. The botany of Bihar and Orissa. An account of all the known indigenous plants of the province and of the most important or most commonly cultivated exotic ones. Gamopetalae. Part IV. *Small 8vo*, p. 419-754. Adlard & Son & West Newman: London, 1922.—This part follows strictly the plan of previously issued parts of the work and includes the families Rubiaceae to Labiatae, arranged essentially in the sequence of Bentham and Hooker's Genera Plantarum. The following apparently new names and combinations are included: *Gardenia gummifera* L.f. var. *gummiferoides*, *Blumea atropurpurea*, *B. lacera* DC. var. *erianthoides*, *Spilanthes acmella* L. var. *typica*, *Sonchus arvensis* L. vars. *typica* and *glaber*, *Lobelia zeylanica* L. var. *aligera* (*L. aligera* Haines), *Mimusops hezandra* Roxb. vars. *typica* and *orizensis*, *Diospyros sylvatica* Roxb. var. *latifolia*, *Carissa paucinervia* A. DC. vars. *opaca* Stapf and *gangetica* Stapf, *C. spinarum* L. vars. *diffusa* and *scandens*, *C. inermis* Vahl var. *Dalzellii*, *Swertia angustifolia* Ham. var. *pyramidalis*, *Hydrolea zeylanica* Vahl vars. *erecta* and *diffusa*, *Ipomoea hastata* (*Merremia hastata* Hallier), *I. caespitosa*, *I. cymosa* R. & S. var. *cochleata*, *I. turpethum* Br. var. *humilior*, *Convolvulus paniculatus* (*Ipomoea paniculata* Burm.), *Datura Stramonium* L. var. *Wallichii* (*D. Wallichii* Dunal), *Limnophila hirsuta* Benth. var. *Clarkei*, *Vandellia crustacea* Benth. var. *verticillata*, *V. brachiata* (*Bonnaya brachiata* Link & Otto), *V. veronicaefolia* (*Bonnaya veronicaefolia* Spreng.), *V. verbenaeefolia* (*Bonnaya verbenaeefolia* Spreng.), *V. oppositifolia* (*Bonnaya oppositifolia* Spreng.), *V. tenuifolia* (*Bonnaya tenuifolia* Spreng.), *Lindernia parviflora* (*Ilysanthes parviflora* Benth.), *L. hyssopioides* (*Ilysanthes hyssopioides* Benth.), *Didissandra lanuginosa* Clarke var. *minuta*, *Tecoma stans* (L.) Juss. var. *apiifolia*, *Stereospermum angustifolium* (*S. chelonoides* var. *angustifolium* Haines), *S. chelonoides* (*Bignonia chelonoides* L. f.), *Dolichandrone falcata* Seem. var. *Lawii* (*D. Lawii* Seem.), *Barleria cristata* L. var. *albida*, *Premna flavescens* Ham. var. *gmelinoides*, *P. latifolia* Roxb. var. *Gamblei* (*P. integrifolia* Gamble), *Orthosiphon grandiflorus* (*Ocimum grandiflorum* Blume), *Nepeta hindostana* (*Glechoma hindostana* Roth), and *Leucas montana* Spreng. vars. *mollissima*, *pilosa* (*L. pilosa* var. *pubescens* Benth.), and *parvifolia*.—*J. M. Greenman.*

2170. RYDBERG, PER AXEL. Ambrosiaceae. North Amer. Flora 33: 3-44. 1922.—The author treats the genera *Iva*, *Leuciva*, *Oxytenia*, *Chorisiva*, *Cyclachaena*, *Euphrosyne*, *Dicoria*, *Hymenoclea*, *Ambrosia*, *Acanthambrosia*, *Franseria*, and *Xanthium* as a distinct family of the Carduales. Generic and specific characterizations are given together with a complete citation of synonymy, statement of the type locality, and distribution of the species. The following new genera, new combinations, and new species occur: *Leuciva* n. gen. *L. dealbata* (*Iva dealbata* Gray), *Chorisiva* n. gen., *C. nevadensis* (*Iva nevadensis* M. E. Jones), *Cyclachaena pedicellata*, *C. lobata*, *Dicoria oblongifolia*, *D. hispidula*, *Hymenoclea pentalepis*, *Ambrosia monophylla* (*Iva monophylla* Walt.), *A. diversifolia* (*A. artemisiifolia diversifolia* Piper), *A. Rugelii*, *A. californica*, *Acanthambrosia* n. gen., *A. Bryantii* (*Franseria Bryantii* Curran), *Franseria Palmeri*, *F. villosa* (*F. bipinnatifida villosa* Eastw.), *F. linearis* (*Gaertneria linearis* Rydb.), *F. canescens* (*Ambrosia fruticosa* var. *canescens* Benth.), *F. strigulosa*, *F. confertiflora* (*Ambrosia confertiflora* DC.), *F. Pringlei*, *F. caudata*, *F. hispidissima*, *F. incana*, *F. leptophylla* (*F. camphorata* var. *leptophylla* Gray), *F. intricata*, *F. malvacea*, *F. Sanctae-Gertrudis*, and *F. lancifolia*.—*E. B. Payson.*

2171. RYDBERG, PER AXEL. *Carduaceae*. North Amer. Flora 33: 45-46. 1922.—In the present part of volume 33 Rydberg commences the treatment of the family *Carduaceae* with a characterization of the family as a whole and the presentation of a key to the 17 tribes into which he separates the family. The first tribe, the *Vernonieae*, is elaborated by GLEASON.—E. B. Payson.

PTERIDOPHYTES

2172. DEAM, C. C. Is *Botrychum dissectum* a sterile mutant? Amer. Fern Jour. 11: 114. March 31, 1922.

2173. FERNALD, M. L. *Polypodium virginianum* and *P. vulgare*. Rhodora 24: 125-142. 1922.—Detailed study of the American plants leads to the conclusion that the plant of eastern America which has long passed as *Polypodium vulgare* is a distinct species, *P. virginianum* L., which reappears in eastern Asia, while the plants of the Pacific slope which have been known as *P. californicum* Kaulf., *P. intermedium* Hook. & Arn., *P. falcatum* Kellogg, and *P. hesperium* Maxon are an intergradient series with all the specific characters of the European *P. vulgare*. The following new names occur: *P. vulgare* var. *intermedium* (Hook. & Arn.) n. comb. based on *P. intermedium* Hook. & Arn., var. *intermedium* forma *projectum* n. f., var. *Kaulfussii* (D. C. Eaton) n. comb. based on *P. californicum* var. *Kaulfussii* D. C. Eaton; and under *P. virginianum* forma *acuminatum* (Gilbert) n. comb. based on *P. vulgare acuminatum* Gilbert, forma *elongatum* (Jewell) n. comb. based on *P. vulgare* forma *elongatum* Jewell, forma *brachypterum* (Ridlon) n. comb. based on *P. vulgare* forma *brachypterum* Ridlon, forma *subsimplex* n. f., forma *deltoideum* (Gilbert) n. comb. based on *P. vulgare* forma *deltoideum* Gilbert, forma *bipinnatifidum* n. f., forma *chondroides* n. nom. for *P. vulgare* var. *bifido-multifidum* Gilbert not Druery, forma *alato-multifidum* (Gilbert) n. comb. based on *P. vulgare* var. *alato-multifidum* Gilbert, and forma *Churchiae* (Gilbert) n. comb. based on *P. vulgare* var. *Churchiae* Gilbert.—M. L. Fernald.

2174. HOPKINS, L. S. Is *Botrychum dissectum* a sterile mutant? Amer. Fern Jour. 11: 114-116. March 31, 1922.

2175. MAXON, WILLIAM R. Notes on American ferns—XVIII. Amer. Fern Jour. 11: 105-107. March 31, 1922.—Range is extended for 4 species; and a note is given on the reported hybrid between *Polystichum acrostichoides* (Michx.) Schott and *Dryopteris cristata* (L.) Gray, which seems to be only an extreme form of *Polystichum acrostichoides* (Michx.) Schott.—F. C. Anderson.

2176. MAXON, WILLIAM R. Studies of tropical American ferns—No. 7. Contrib. U. S. Nation. Herb. 24: 33-63. Pl. 11-20. 1922.—This paper consists of studies of various small groups of tropical American ferns. A revision of the North American species of *Alsophila* grouped with *A. armata* contains a key to 13 species, with full descriptions and synonymy. *A. strigillosa* (Cuba), *A. notabilis* (Cocos Island), *A. pansamalana* (Guatemala), *A. nesiotica* (Cocos Island), and *A. trichiata* (Costa Rica and Panama) are new. A new *Alsophila*, *A. Williamsii* from Panama, of another group, is also described. The following new names and new species appear under *Dicranopteris*: *D. affinis* (Mett.), *D. Brittonii* (from Trinidad), *D. gracilis* (Mart.), *D. longipes* (Fée), *D. longipinnata* (Hook.), *D. maritima* (Hieron.), *D. nervosa* (Kaulf.), *D. nuda* (Moritz), *D. pennigera* (Mart.), *D. pruinosa* (Mart.), *D. remota* (Kaulf.), *D. rubiginosa* (Mett.), *D. simplex* (Desv.), *D. velata* (Kunze), *D. yungensis* (Rosenst.). A key to the 4 species of *Cheilanthes* known from Jamaica is given. Two, *C. Harrisii* and *C. jamaicensis*, are new. *Polystichum deminuens*, from Cuba, and *P. Killipii*, from Jamaica, are described as new. *Atalopteris* Maxon & C. Chr. n. gen., based on 2 species heretofore referred to *Psomiocharpa*, is described and discussed, and a key is given to the 2 known species, *A. aspidioides* (Griseb.) Maxon & C. Chr., from Cuba, and *A. Maxoni* (Christ) C. Chr., from Jamaica. Three new species of the subgenus *Stigmatopteris* of *Dryopteris* are described: *D. nothochlaena*, from Jamaica, *D. hemiptera*, from Cuba, and *D. sordida*, from Guatemala.

Under miscellaneous notes, various range extensions are listed, and new combinations and names are made as follows: *Pityrogramma schizophylla* (Baker), *P. Eggersii* (Christ), and *Dryopteris anceps* (*Acrostichum Fendleri* Baker). . Ten of the species described in this paper are illustrated by photographic plates.—S. F. Blake.

2177. WEATHERBY, C. A. The group of *Polypodium lanceolatum* in North America. Contrib. Gray Herb. 65: 3-14. 1922.—As here understood *P. lanceolatum* is a species of wide distribution in tropical regions of America, Africa, and India and in its main distinguishing characters it is constant enough throughout its range, but in certain other characters, notably those of the scales of the rootstalk, it varies considerably. The most readily recognizable of these variants occur in Mexico and Central America and it is these divergent forms which are considered in the present paper. A key is given to the several species and varieties of this group and synonyms and exsiccatae are freely cited. The following new species and varieties and new combinations are described: *P. lanceolatum* L. var. *complanatum*, *P. lanceolatum* L. var. *crassinervatum* (*Drynaria crassinervatum* Fée), *P. lanceolatum* L. var. *tricophorum*, *P. erythrolepis*, *P. Conzattii*, *P. fruticosum* Maxon & Weatherby, *P. panamense*.—E. B. Payson.

SPERMATOPHYTES

2178. AMES, O. Descriptions of new orchids from tropical America with nomenclatorial changes. Proc. Biol. Soc. Washington 35: 81-88. 1922.—*Aa Rosei*, *Bletia Nelsonii*, *Malaxis mexicana*, *M. Rosei*, *M. tepicana*, *Pelexia Mazonii*, *Platystele compacta*, *Pleurothallis palliolata*, and *Stelis Johnsonii* are described as new species. The following new combinations are made: *Malaxis acianthoides* (*Microstylis acianthoides* Schltr.), *Malaxis blephariglottis* (*Microstylis blephariglottis* Schltr.), *Malaxis brachyrrhyncha* (*Microstylis brachyrrhyncha* Reichb. f.), *Malaxis Javesiae* (*Microstylis Javesiae* Reichb. f.), *Malaxis lepanthiflora* (*Microstylis lepanthiflora* Schltr.), *Malaxis lepidota* (*Microstylis lepidota* Finet), *Malaxis linguella* (*Microstylis linguella* Reichb. f.), *Malaxis minutiflora* (*Microstylis minutiflora* Schltr.), *Malaxis monticola* (*Microstylis monticola* Schltr.), *Malaxis ocreata* (*Microstylis ocreata* S. Wats.), *Malaxis pandurata* (*Microstylis pandurata* Schltr.), *Malaxis Pittieri* (*Microstylis Pittieri* Schltr.), *Malaxis platyglossa* (*Microstylis platyglossa* Robins. & Greenm.), *Malaxis Pringlei* (*Microstylis Pringlei* S. Wats.), *Malaxis streptopetala* (*Microstylis streptopetala* Robins. & Greenm.), *Malaxis tenuis* (*Microstylis tenuis* S. Wats.), *Malaxis Tonduzii* (*Microstylis Tonduzii* Schltr.), *Malaxis Tuerckheimii* (*Microstylis Tuerckheimii* Schltr.), *Malaxis Wercklei* (*Microstylis Wercklei* Schltr.).—J. C. Gilman.

2179. ASHE, W. W. Notes on trees and shrubs of southeastern North America. Rhodora 24: 77-79. 1922.—The range of *Viburnum densiflorum* Chapm. is extended from Alabama into Newton County, Texas, and of *Quercus hybrida* (Chapm.) Small from Mississippi into Newton County; *Quercus obtusa* (Willd.) Ashe is maintained as a coastal plain species distinct from *Q. laurifolia* Michx. The following are new: *Quercus arenicola* n. nom., based on *Q. hybrida* (Chapm.) Small (1903), not Bechst. (1829); *Q. arenicola integra* n. var.; *Q. obtusa obovatifolia* (Sargent) n. comb., based on *Q. rhombica* var. *obovatifolia* Sargent; *Q. moultonensis* n. nom., based on *Q. hybrida* Houba (1887), not Bechst. (1829); *Q. nigra heterophylla* n. comb., based on *Q. aquatica* var. Ait., and *Acer barbatum sinuosum* (Rehder) n. comb., based on *A. sinuosum* Rehder.—M. L. Fernald.

2180. ASHE, W. W. Notes on the trees and shrubs of the southeastern United States. Bull. Torrey Bot. Club 49: 265-268. 1922.—The following are published: *Castanea pumila* Margaretta var. nov., *C. floridana* (Sarg.) comb. nov., *C. Ashei* (Sudworth) comb. nov., \times *Quercus coloradensis* hybr. nov. (*Q. virginiana* Mill. \times *Q. macrocarpa* Michx.), *Q. nigra elongata* comb. nov., *Malus elongata pubens* var. nov., and *M. platycarpa parvula* var. nov. A key is given to the *Castanea pumila* group.—P. A. Munz.

2181. BARTLETT, H. H. Color types of *Corallorrhiza maculata* Raf. Rhodora 24: 145-148. 1922.—Three color types from Michigan are described and designated *Corallorrhiza maculata* var. *flavida* (Peck) n. comb., based on *C. multiflora flavida* Peck, var. *fusca* n. var., and var. *punicea* n. var.—M. L. Fernald.

2182. BLAKE, S. F. **New Asteraceae from Utah and Nevada.** Proc. Biol. Soc. Washington 35: 173-178. 1922.—*Chrysopsis viscida cinerascens*, *Aster glaucodes pulcher*, *Erigeron caespitosus anactis*, and *Tetradymia comosa tetrameres* are described as new subspecies. *Aplopappus brickellioides*, *Aster bellus*, *Bahia ourolepis*, and *Ptiloria cinerea* are described as new species.—J. C. Gilman.

2183. BLAKE, S. F. **New plants from South and Central America collected by Wilson Popenoe.** Proc. Biol. Soc. Washington 35: 117-124. 1922.—*Tibouchina asperipilis*, *Centronia tunguraguae*, *Gaultheria pubiflora*, *Disterigma margaricoccum*, *D. Popenoei*, *Macleania irazuensis*, *M. laurina*, *M. Popenoei*, and *Citharexylum subflavescens* are described as new species.—J. C. Gilman.

2184. BLAKE, S. F. **The identity of the genus *Adventina* Raf.** *Rhodora* 24: 34-36. 1922.—Rafinesque's *Adventina* (1836) proves to be identical with *Galinsoga* Cav. (1794) and his *Adventina ciliata* forms the basis of *Galinsoga ciliata* (Raf.) n. comb., which is identical with *G. aristulata* Bicknell (1916). Rafinesque's account furnished the first records of either *G. aristulata* or *G. parviflora* in the U. S. A.—M. L. Fernald.

2185. BLAKE, S. F. **Two new species of Moraceae from South America.** Proc. Biol. Soc. Washington 35: 179-180. 1922.—The species described are *Brosimum columbianum* and *Brosimopsis diandra*.—J. C. Gilman.

2186. BRITTON, N. L., and J. N. ROSE. **Two new genera of Cactaceae.** Bull. Torrey Bot. Club 49: 251-252. 1922.—*Thelocactus* (Schumann), formerly a subgenus under *Echinocactus*, is raised to generic rank; *Neolloydia* gen. nov. is published. The following new combinations are made: *Thelocactus hexaedrophorus* (Lemaire), *T. bicolor* (Galeotti), *T. lophothele* (Salm-Dyck), *Neolloydia conoidea* (De Candolle), and *N. Beguinii* (Weber). The first named species under each genus is the type species.—P. A. Munz.

2187. ENGLER, A. **Additamentum ad Araceas-Philodendroideas.** Das Pflanzenreich Heft 71 (IV. 23E). 2* p. 1920.—This is a short supplement to Engler and Kraus *Araceae-Philodendroideae-Philodendreae*, Das Pflanzenreich Heft 55 (IV. 23Da), 1912, and concerns primarily the genera *Ariarum* and *Piptospatha*. One new combination is included, namely, *Piptospatha perakensis* (*P. elongata* N. E. Brown var. *perakensis* Engler, *Rhynchophyle perakensis* Ridley).—J. M. Greenman.

2188. ENGLER, A., und K. KRAUSE. **Araceae-Colocasioideae.** Das Pflanzenreich Heft 71 (IV. 23E). 139 p., 29 fig. 1920.—Three tribes are included in the subfamily treated in the present part, namely, *Colocasieae*, *Syngonieae*, and *Ariopsidae*. These tribes embrace 15 tropical genera of which the largest and best known are *Alocasia*, *Xanthosma*, *Caladium*, and *Syngonium*. The following new species, varieties, and combinations are included; and the authorship, unless otherwise indicated, should be attributed to Engler: *Steudnera Henryana*; *S. Gagei* Krause; *Gonatanthus punilius* Engl. & Krause (*Caladium punilum* D. Don); *Caladium angustifolium*; *C. Schomburgkii* Schott var. *venosum* (*C. venosum* N. E. Brown) and *rubescens* (*C. rubescens* N. E. Brown); *C. bicolor* (Ait.) Vent. vars. *surinamense* (*C. surinamense* Miq.), *bohemicum* (*C. bohemicum* Hort.), and *roseo-maculatum*; *C. picturatum* C. Koch vars. *adamanthinum* (*C. adamantinum* L. Lind.) and *sagittatum* (*C. sagittatum* L. Lind. & Rodig.); *Xanthosma atrovirens* C. Koch vars. *Kochii*, *Moritzii* (*X. atrovirens* C. Koch & Bouché var. *versicolor* C. Koch), and *panduriforme*; *X. Ulei*; *X. mafaffa* Schott var. *typicum*; *X. belophyllum* (Willd.) Kunth var. *Kunthii*; *X. obtusilobum*; *X. Buchtienii*; *X. Riedelianum* Schott var. *brancoanum*; *X. Eggersii* (*Caladium Eggersii* Engl.); *X. brasiliense* (*Caladium brasiliense* Desf); *X. helleborifolium* (Jacq.) Schott vars. *angustisectum* (*X. angustisectum* Engl.) and *Weberbaueri*; *Colocasia antiquorum* Schott var. *globulifera* Engl. & Krause; *Alocasia Merrillii* Engl. & Krause; *A. atropurpurea*; *A. Gageana* Engl. & Krause; *A. crassinervia*; *A. crassifolia*; *A. inornata* Hallier f.; *A. indica* (Roxb.) Schott vars. *typica*, *violacea*, and *diversifolia* (*A. indica* var. *hetero-*

phylla (Schott) Engl.); *A. Lecomtei*; *A. tonkinensis*; *A. hainanensis* Krause; *A. grata* Prain; *A. denudata* Engl. var. *elongato*; *A. Uhinkii* Hort. (*A. macrorrhiza* × *indica* var. *metallica*); *A. Leopoldi* Hort. (? *A. indica* × *Sanderiana*); *A. splendens* (Hort.) Linden (? *A. indica* × *Sanderiana*); *A. subodora* Engl. & Krause (*A. odora* × *argyrea*); *Schizocasia acuta* Engl. var. *typica*; *Syngonium Rothschuhianum*; *S. Vellozianum* Schott var. *oblongisectum*; *S. macrophyllum*; *S. amazonicum*; *S. podophyllum* Schott vars. *Oerstedianum* (*S. Oerstedianum* Schott), *multi-sectum*, and *albolineatum* (*S. albolineatum* Hort.).—J. M. Greenman.

2189. FASSETT, NORMAN C. *Lophotocarpus* on the northeastern river-estuaries. *Rhodora* 24: 71-73. Pl. 137. 1922.—*Lophotocarpus calycinus* (Engelm.) J. G. Smith, a southern species, has well developed sagittate leafblades; while the more northern *L. spongiosus* (Engelm.) J. G. Smith, a plant confined to estuaries from the Delaware River to the Gulf of St. Lawrence, has the blades commonly obsolete. No differences are found in the fruit and study of a large series of specimens demonstrates that where their ranges are coincident the 2 plants intergrade but northward the sagittate blades become progressively rarer until the more northern colonies bear only phyllodia. The new combination, *L. calycinus* var. *spongiosus* (Engelm.) Fassett, is made—M. L. Fernald.

2190. FERNALD, M. L. *Brassica arvensis* (L.) Kuntze, var. *Schkuhriana* (Reichenb.) n. comb. *Rhodora* 24: 36. 1922.—The transfer is based on *Sinapis Schkuhriana* Reichenb. (1837-38).—M. L. Fernald.

2191. FERNALD, M. L. *Lysimachia terrestris* (L.) BSP., var. *ovata* (Rand and Redfield), n. comb. *Rhodora* 24: 76. 1922.—The new combination is based on *L. stricta* var. *ovata* Rand & Redfield (1894).—M. L. Fernald.

2192. FERNALD, M. L. Notes on *Sparganium*. *Rhodora* 24: 26-34. 1922.—Notes are given on the identity and geographic distribution of critical American species, with key to the species of eastern North America. The following are recognized: *S. eurycarpum* Engelm., *S. androcladum* (Engelm.) Morong (*S. lucidum* Fernald & Eames), *S. americanum* Nutt., *S. chlorocarpum* Rydberg (*S. diversifolium* of American authors), *S. chlorocarpum* var. *acaule* (Beeby) n. comb., *S. angustifolium* Michx. (*S. affine* Schnitzl.), *S. fluctuans* (Morong) Robinson, *S. minimum* Fries, and *S. hyperboreum* Laestad.—M. L. Fernald.

2193. FERNALD, M. L. Some variations of *Cakile edentula*. *Rhodora* 24: 21-23. 1922.—The author divides the species into var. *typica* (Iceland and Labrador to South Carolina; Azores), var. *lacustris* n. var. (strands of the Great Lakes), and var. *californica* (Heller) n. comb. (*C. californica* Heller, British Columbia to California).—M. L. Fernald.

2194. FERNALD, M. L. The American variations of *Linnaea borealis*. *Rhodora* 24: 210-212. 1922.—The author recognizes in America: typical *L. borealis* L. (*L. serpyllifolia* Rydb.) in Alaska; var. *americana* (Forbes) Rehder, Greenland and Labrador to Alaska and south to the northern and upland states; var. *longiflora* Torr., British Columbia to northern California.—M. L. Fernald.

2195. FERNALD, M. L. The generic name *Phragmites*. *Rhodora* 24: 55-56. 1922.—The author discusses the names *Phragmites* and *Trichoon* Roth (1798), the latter taken up by some European authors as antedating *Phragmites* Trin. (1820). The latter name, however, dates from Adanson (1763) and should be retained.—M. L. Fernald.

2196. FERNALD, M. L., and C. A. WEATHERBY. Varieties of *Geum canadense*. *Rhodora* 24: 47-50. 1922.—Besides typical *G. canadense* the following are recognized: forma *glandulosum* n. f., var. *texanum* n. var., var. *camporum* (Rydberg) n. comb. (*G. camporum* Rydberg), var. *camporum* f. *adenophorum* n. f., var. *Grimesii* n. var.—M. L. Fernald.

2197. GLEASON, HENRY ALLEN. *Vernonieae*. North Amer. Flora 33: 47-110. 1922.—As the first tribe of the *Carduaceae* the author presents a complete treatment of the 19 recognized genera of this tribe. Of these 19 genera *Vernonia* is the largest with 123 species. Keys to the genera and species are given as well as a complete citation of synonymy, statement of type localities, distribution, and illustrations. The following new species and new combinations are included: *Centratherum violaceum* (*Spixia violacea* Schrank), *Vernonia callilepis*, *Eremosia oolepis* (*Vernonia oolepis* Blake), *E. angusta*, *E. callilepis* (*Vernonia Steetzii* var. *callilepis* Schz. Bip.), *E. obtusa*, *E. littoralis* (*Vernonia littoralis* Brand.), *Oliganthes ferruginea*.—*E. B. Payson*.

2198. HOEHNE, F. C. *Melastomáceas dos Hervários: Horto "Oswaldo Cruz," Museu Paulista, Comissão de Linhas Telegráficas Estratégicas de Mato-Grosso ao Amazonas, Jardim Botânico do Rio de Janeiro, etc.* [Melastomaceae of the herbaria of the Horto "Oswaldo Cruz," Paulista Museum, Commission of the strategic telegraph lines of Mato-Grosso on the Amazon, of the Botanical Garden of Rio de Janeiro, etc.] *Anexos Mem. Inst. Butantan [Bot.] 15: 1-198. Pl. 1-21, and frontispiece.* 1922.—The Melastomaceae represented in the various herbaria mentioned are treated in detail with brief descriptions, critical notes, and the citation of specimens for each species. The following species and varieties are described as new: *Microlicia Warmingiana* Cgn. var. *glandulosa*, *M. insignioides*, *M. insignioides* var. *gracilis*, *M. suborbicularifolia*, *M. sulfurea*, *M. Bradeana*, *Lavoisiera itabirana*, *Rhynchanthera spicata*, *R. corumbaensis*, *R. cacerensis*, *R. linearifolia*, *R. coxinnensis*, *Poteranthera genliseoides*, *Acisanthera bracteosa* (*Comolia bracteosa* Huber), *Macairea villosa*, *M. goyazensis*, *Tibouchina paulistana*, *T. Valtherii* Cgn. var. *minor*, *T. urceolaris* Cgn. var. *papillosa*, *T. rupicola*, *Comolia affinis*, *C. Kuhlmannii*, *Leandra purpureo-villosa*, *L. xantholasia* Cgn. var. *setulosa*, *L. cardiophylla* Cgn. var. *integra*, *L. aurea* Cgn. var. *aggregatiflora*, *L. sparsisetulosa*, *L. hirtella* Cgn. var. *Löfgrenii*, *L. pauloensis*, *Miconia nambyquarae*, *M. Camposnovaesii*, *M. rubiginosa* DC. var. *Kuhlmannii*, *M. cubatanensis*, *M. petropolitana* Cgn. var. *macrophylla*, *M. mattogrossensis*, *M. theaezans* Cgn. var. *setulosa*, *Tococa Kuhlmannii*, *Clidemia cubatanensis*, *C. Kuhlmannii*, *C. longisetosa*, *C. rubra* Mart. var. *ursina*, *C. pusilliflora*, *Henriettella Duckeana*, *Ossaea Duckeana*, *Topobea rupicola*, *Mouriria pusa* Gardn. var. *grandifolia*.—*E. B. Payson*.

2199. INMAN, O. L. *Calamagrostis canadensis* and some related species. *Rhodora 24: 142-144.* 1922.—The author gives a key to and synonymy of *Calamagrostis Macouniana* Vasey, *C. canadensis* (Michx.) Nutt., *C. canadensis* var. *robusta* Vasey, *C. canadensis* var. *Langsdorfi* (Link) n. comb. based on *Arundo Langsdorfi* Link, *C. blanda* Beal, *C. perplexa* Scribn., *C. Porteri* Gray, and *C. Scribneri* Beal.—*M. L. Fernald*.

2200. KRAUSE, K., e F. C. HOEHNE. *Contribuições ao conhecimento das Rubiaceas do Brasil meridional.* [Contributions to the knowledge of the Rubiaceae of southern Brazil.] *Anexos Mem. Inst. Butantan [Bot.] 15: 1-33. Pl. 1-6.* 1922.—Many Rubiaceae species of southern Brazil are listed with notes as to their distribution, habits of growth, and common names. The following species are described as new by K. Krause: *Coccocypselum cordatum*, *Psychotria florestana*, *P. Hoehnei*, *Palicourea Hoehnei*, *Faramea Hoehnei*, *Richarsonia acutifolia*.—*E. B. Payson*.

2201. LINDER, D. H. Some varieties of *Panicum virgatum*. *Rhodora 24: 11-16. Fig. 1-6.* 1922.—The following varieties are discussed: var. *cubense* Griseb., var. *scorteum* n. var. from Bermuda, var. *thyrsiforme* n. var. from Florida and Mississippi; var. *spissum* n. var. from Nova Scotia to New Jersey and central New York.—*M. L. Fernald*.

2202. LINGELSHEIM, A. *Oleaceae-Oleoideae-Fraxineae und Oleaceae-Oleoideae-Syringaeae.* *Das Pflanzenreich Heft 72 (IV. 243 i u. ii).* 125 p., 22 fig., 1 map. 1920.—Two genera are included in the tribe *Fraxineae*, namely, *Fontanesia* and *Fraxinus*. The former has but a single species, *Fontanesia phillyreoides* Labill., with varieties *mediterranea* (F. *phillyreoides* C. K. Schneider) of the Mediterranean region and *Fortunei* (Carr.) Koehne of

China. *Fraxinus* includes 64 recognized species and numerous varieties. The following new species, varieties, and combinations are recorded: *Fraxinus ornus* L. vars. *typica* Lingelsh. and *sanguinea* Hausmann & Lingelsh., *F. Paxiana* Lingelsh. var. *depauperata*, *F. retusa* Champ. vars. *typica* and *integra*, *F. fallax*, *F. stylosa*, *F. longicuspis* Sieb. & Zucc. var. *Sieboldiana* (Blume), *F. chinensis* Roxb. vars. *typica*, *rotundata*, *tomentosa*, and *acummata*, *F. yunnanensis* (*F. velutina* Lingelsh., not Torr.), *F. dipetala* Hook. & Arn. var. *typica*, *F. Schiedeana* Schlecht. & Cham. vars. *typica* and *palmarum*, *F. Jonesii*, *F. xanthoxyloides* Wall. var. *dimorpha* (Coss. & Dur.), *F. americana* L. var. *albicans* (Buckl.), *F. pennsylvanica* Marsh. var. *pubescens* (Lam.), *F. Rehderiana*, *F. oregona* Nutt. vars. *latifolia* (Benth.) and *glabra*, *F. velutina* Torr. vars. *typica*, *glabrata*, and *coriacea* (Wats.), *F. lanceolata* Borkh. vars. *viridis* (Michx.), *macrocarpa*, and *Lindheimeri* (Wenzig), *F. Uhdei* (Wenzig) Lingelsh. vars. *typica* and *pseudoperiptera*, *F. caroliniana* Mill. vars. *platycarpa* (Michx.) and *cubensis* (Griseb.), *F. elbursensis*, *F. syriaca* Boiss. var. *persica* (Boiss.), *F. oxycarpa* Willd. vars. *oxyphylla* (Marsch. Bieb.), *angustifolia* (Vahl), *algeriensis*, *australis* (Gay), *macrocarpa*, and *tamariscifolia* (Vahl), *F. Bornmülleri*, *F. Brandisii*, and *F. nigra* Marsh. vars. *sambucifolia* (Lam.) and *mandschurica* (Rupr.). Two new hybrids are also recorded, namely, *F. americana* × *pennsylvanica* (*F. Biltmoreana* Beadle) and *F. lanceolata* × *pennsylvanica* (*F. cinerea* Bosc.). A map accompanies the text, which shows the geographical distribution of *Fraxinus*. The tribe *Syringaceae* embraces 3 genera, namely, *Syringa*, *Schrebera*, and *Forsythia*. These genera, on account of the long corolla-tube, dehiscence of capsule, and winged seeds, constitute a natural group; their center of geographical distribution is in central Asia. The following new species, varieties, and combinations are recorded: *Syringa villosa* Vahl var. *Limprichtii*, *S. glabra* (*S. villosa* var. *glabra* C. K. Schneider), *S. Schneideri* (*S. Dielsiana* Schneider, in part), *S. oblata* Lindl. vars. *typica* and *affinis* (*S. affinis* Henry), *S. persica* L. vars. *typica* and *coriacea*, *S. amurensis* Rupr. var. *rotundifolia* (Decne.), *Schrebera Schellenbergii*, *S. excelsa* with vars. *typica* and *somnifera*, *S. Nyassae*, *S. Gilgiana*, and *Forsythia suspensa* (Thunb.) Vahl var. *pubescens* (Rehder).—J. M. Greenman.

2203. MACBRIDE, J. FRANCIS. A revision of *Astragalus*, subgenus *Homalobus*, in the Rocky Mountains. Contrib. Gray Herb. 65: 28–39. 1922.—The author treats the species of this group from the same range as is included in Rydberg's *Flora of the Rocky Mountains and Adjacent Plains*, but recognizes only 26 species instead of the 45 maintained by Rydberg under *Homalobus* as a distinct genus. A dichotomous key is presented for the species and varieties treated. Specimens are cited for each species and variety and synonyms are freely included. The following new names, varieties, and forms occur: *Astragalus tenellus* Pursh forma *strigulosus* (*Homalobus strigulosus* Rydb.), *A. tenellus* Pursh var. *Clementis* (*Homalobus Clementis* Rydb.), *A. tenellus* Pursh forma *acerbus* (*A. acerbus* Sheld.), *A. campestris* (Nutt.) Gray var. *diversifolius* (*A. diversifolius* Gray), *A. Garrettii* (*Homalobus paucijugus* Rydb.), *A. Carletonii* (*Homalobus humilis* Rydb.), *A. hylophilus* (Rydb.) A. Nels. var. *oblongifolius* (*Homalobus oblongifolius* Rydb.), *A. Rydbergii* (*Homalobus decurrens* Rydb.) *A. serotinus* Gray var. *strigosus* (*A. strigosus* Coult. & Fish.), *A. serotinus* Gray var. *Palliseri* (*A. Palliseri* Gray), *A. curvicarpus* (*A. speiroparpus* Gray var. *curvicarpus* Sheld.).—E. B. Payson.

2204. MACBRIDE, J. FRANCIS. Notes on certain Leguminosae of the tribe Psoraleae. Contrib. Gray Herb. 65: 14–23. 1922.—The following new species and varieties as well as new names and combinations are given: *Psoralea tenuiflora* Pursh var. *Bigelovii* (*Psoralidium Bigelovii* Rydb.), *P. scaposa* (*P. hypogaea* Nutt. var. *scaposa* Gray), *P. humilis* (*Pedimelum humile* Rydb.), *P. macrostachya* DC. var. *longiloba* (*Hoita longiloba* Rydb.), *P. arosela* Benth. (*Dalea Benth. Brandg.*), *P. megacarpa* (*Dalea megacarpa* Wats.), *P. Fremontii* (Torr.) Vail var. *Wheeleri* Robinson (*P. Wheeleri* Vail), *P. Fremontii* (Torr.) Vail var. *Saundersii* (*Dalea Saundersii* Pursh), *P. tinctoria* (*Dalea tinctoria* Brandg.), *P. mollis* (Benth.), Heller var. *neo-mexicana* (*Dalea mollis* Benth. var. ? *neo-mexicana* Gray), *P. laxiflora* (*Dalea laxiflora* Schlecht.), *P. leporina* (Ait.) Rydb. var. *alba* (*Dalea alba* Michx.), *P. leporina* (Ait.) Rydb. var. *Thouini* (*Dalea Thouini* Schrank), *P. vernicia* Rose var. *citrina* (*P. citrina* Rydb.), *P. tomentosa* (Cav.) Rose var. *psoraleoides* (*Dalea psoraleoides* Moric.), *P. polycephala* (Benth.)

Rydb. var. *minutifolia* (*P. minutifolia* Rydb.), *P. triphylla* (*Dalea triphylla* Sessé & Moc.), *P. versicolor* (Zucc.) Rydb. var. *tsugoides* (*P. tsugoides* Rydb.), *P. Wislizeni* (Gray) Vail var. *Sanctae-Crucis* (*P. Sanctae-Crucis* Rydb.), *P. lasiostachya* (Benth.) Rose var. *glabrescens* (*P. glabrescens* Rydb.), *P. lasiostachya* (Benth.) Rose var. *involuta* (*P. involuta* Rydb.), *P. lutea* Cav. var. *caudata* (*P. caudata* Rydb.), *P. Arsenei*, *P. Dalea* (L.) Britton var. *robusta* (*Thornbera robusta* Rydb.), *P. pumila* (*Thornbera pumila* Rydb.), *P. tenuicaulis* (*Dalea tenuicaulis* Hook. f.), *P. pazensis* (*Dalea pazensis* Rusby), *P. parvifolia* (*Dalea parvifolia* Hook. f.), *P. multifoliolata* (*Psoralea multifoliolata* Clos), *P. humifusa* (*Dalea humifusa* Benth.), *P. cylindrica* (*Dalea cylindrica* Hook.), *P. coerulea* (*Galega coerulea* L. f.), *P. calliantha* (*Dalea calliantha* Ulbrich), and *P. boliviana* (*Dalea boliviana* Britton). A key is given to the species closely related to *Parosela microphylla*.—E. B. Payson.

2205. MACBRIDE, J. FRANCIS. Various North American spermatophytes, new or transferred. Contrib. Gray Herb. 65: 39-46. 1922.—The following new species, varieties, new combinations, and new names are given: *Cleome lutea* Hook. var. *Jonesii*, *Lotus Torreii* (Gray) Greene var. *seorsus*, *Mentzelia laevicaulis* (Dougl.) T. & G. var. *acuminata* Nels. & Macbride (*Nuttallia acuminata* Rydb.), *M. parviflora* (*Bartonia parviflora* Dougl.), *Opuntia compressa* (*Cactus compressus* Salisb.), *Oenothera Abramsi*, *O. erythra* (*Sphaerostigma erythra* Davidson), *Gomphocarpus Torreii*, *G. Torreii* var. *Xanti* (*G. tomentosus* (Torr.) Gray var. *Xanti* Gray), *Phacelia viscida* (Benth.) Torr. forma *albiflora* (*Eutoca albiflora* Nutt.), *Allocarya stipitata* Greene var. *micrantha* (*A. stipitata* Greene subsp. *micrantha* Piper), *Solanum Xanti* Gray var. *Spenceriae*, *Castilleja Douglasii* Benth. var. *contentiosa*, *Lepachys columnifera* (*Rudbeckia columnifera* Nutt.), *Stephanomeria Wheeleri* (*Chaetadelphia Wheeleri* Gray).—E. B. Payson.

2206. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. VI, Part 4. pp. 165-218, pl. 220-223. John Spence: Sydney, July 1922.—In this number the author continues his discussion of hybrids, and adds a 3rd chapter on timber. Two hybrids between *Eucalyptus sideroxylon* A. Cunn. and *E. leucoxylon* F. v. M. are recorded. A 3rd new hybrid \times *E. mcintyrensis* from Mount McIntyre, South Australia, is characterized. Under the caption "Fossil plants attributed to *Eucalyptus*" a brief résumé of the subject is given and the following fossil plants, found in Australia and Tasmania, although previously published, are here redescribed and illustrated: *Eucalyptus Plutii* McCoy; *E. Kayseri* and *E. Milligani* Johnston; *E. Delftii*, *E. Diemenii*, *E. Hayi*, *E. Houtmanni*, *E. Mitchelli*, *E. cretacea*, *E. Davidsoni*, *E. oxleyana*, *E. scoliophylla*, and *E. Warraghiana* Ettingshausen; *E. praecoriacea*, *E. Hermani*, *E. Howittii*, *E. Kitsoni*, *E. Suttoni* (*E. Muelleri* Deane), and *E. Chapmani* Deane (*E. Woollsii* Deane).—J. M. Greenman.

2207. MERRILL, E. D. New or noteworthy Philippine plants, XVII. Philippine Jour. Sci. 20: 367-476. 1922.—One hundred six new species are described, while certain changes in nomenclature are proposed, the most important of which is the acceptance of *Polychroa* Lour. (1790) in place of *Pellionia* Gaudich. (1826). The proposed new species are as follows: *Ficus Xavieri*, *F. kalingaensis*, *Elatostema bontocense*, *E. capizense*, *E. Edañoi*, *E. euphlebiu*, *E. kalingaense*, *E. lignosum*, *E. samarense*, *Pipturus angustifolius*, *Polychroa multinervia*, *P. ferruginea*, *Pycnarrhena membranifolia*, *Goniotalamus puncticulifolius*, *Cryptocarya Edañoi*, *C. cagayanensis*, *Rubus perfulvus*, *R. heterosepalus*, *Cassia mindanaensis*, *Mucuna foveolata*, *M. samarensis*, *Evodia confusa*, *Aglaia cupreo-lepidota*, *Dichapetalum euphlebiu*, *Croton lancilimbus*, *Trigonostemon angustifolius*, *Cyclostemon Bavanii*, *C. oligophlebiu*, *Homalanthus concolor*, *Alchornea pubescens*, *Cleistanthus Barrooi*, *Mangifera parvifolia*, *Lophopetalum paucinervium*, *Meliosma bontocensis*, *Guioa mindorensis*, *Rhamnus mollis*, *Leca nitida*, *Saurauia longipedicellata*, *Pyrenaria mindanaensis*, *Calophyllum obliquinervium*, *Casuarina mindanaensis*, *Aquilaria apiculata*, *Eugenia mirabilis*, *E. lancilimba*, *Schefflera bukidnonensis*, *S. halconensis*, *S. cinnamomea*, *Arthropphyllum Cenabrei*, *Alangium pilosum*, *Dimorphanthera mindanaensis*, *Styphelia philippinensis*, *Maesa megalobotrya*, *M. undulata*, *Ardisia calaritensis*, *Discocalyx brachybotrys*, *D. phanerophlebia*, *Embelia elliptica*, *E. luzoniensis*, *E. ovatifolia*, *Rapanea angustifolia*, *R. oblongibacca*, *Madhuca philippinensis*, *Linociera longifolia*, *Gentostoma acumi-*

natissima, *Strychnos Cenabrei*, *Tabernaemontana mindorensis*, *Kopsia grandiflora*, *Clerodendron luzoniense*, *Callicarpa magnifolia*, *Vitex unifoliolata*, *Limnophila obovata*, *Dichrotrichum coriaceum*, *Trichosporum mindanaense*, *Cyrtandra rufotricha*, *C. aclada*, *C. Barnesii*, *C. zamboangensis*, *C. parva*, *C. subglabra*, *Hypoestes mindorensis*, *H. axillaris*, *H. tenuis*, *H. confertiflora*, *Hemigraphis lanceolata*, *H. pachyphylla*, *Peristrophe cordatibractea*, *Strobilanthes pachys* C. B. Clarke, *Hallieracantha brevipetiolata*, *Tarenna pangasinensis*, *Cowiea philippinensis*, *Izora myriantha*, *Pleiocarpidia lanaensis*, *Gardenia megalocarpa*, *Urophyllum mindorensis*, *Argostemma arachnosum*, *Lasianthus mindanaensis*, *L. acuminatissimus*, *Hedyotis camarinensis*, *H. bambusetorum*, *Ophiorrhiza dolichophylla*, *Alsomitra simplicifolia*, *Lonicera mindanaensis*, *Pentaphragma mindanaense*, *Vernonia bontocensis*, *V. mindanaensis*, and *Lactuca integra*. The following new combinations also appear: *Ichnanthus vicinus* (F. M. Bail.), *Cleidion Ramosii* (Merr.), *Hallieracantha aequifolia* (C. B. Clarke), and *H. addisomensis* (Elm.), with *H. Elmeri* as a new name for *Hypoestes pulgarensis* Elm. *Ficus argentea* Blanco, a species of previous entirely doubtful status, is redescribed. Eighteen species of Myrsinaceae recently proposed by Mez are reduced to previously described forms.—E. D. Merrill.

2208. MERRILL, ELMER D. *Studies on Philippine Rubiaceae, IV.* Philippine Jour. Sci. 17: 425-485. 1920.—In this 4th paper of the series, 62 new species are proposed, making 160 new species described in the whole series. The new species are as follows: *Gynochthodes mindanaensis*, *Hedyotis atropurpurea*, *H. brachyantha*, *H. catanduanensis*, *H. diffusissima*, *H. laxiflora*, *H. longipendunculata*, *H. oligantha*, *H. scaberrima*, *H. simplex*, *Izora luzoniensis*, *Morinda coriacea*, *M. nitida*, *Mussaenda acuminatissima*, *Ophiorrhiza Macgregorii*, *O. ovata*, *O. pubiflora*, *O. stenophylla*, *O. tenuis*, *Plectronia brunnea*, *P. oligophlebia*, *P. Ramosii*, *P. subcapitata*, *Psychotria amplissima*, *P. capizensis*, *P. castanea*, *P. cardiophylla*, *P. cordatula*, *P. elliptilimba*, *P. fenicis*, *P. heteromera*, *P. lancilimba*, *P. longipetiolata*, *P. lucida*, *P. magnifolia*, *P. nagapatensis*, *P. obscurinervia*, *P. pallidifolia*, *P. panayensis*, *P. Piperi*, *P. pygmaea*, *P. scaberula*, *P. tricarpa*, *Randia rostrata*, *Tarenna acuminata*, *T. catanduanensis*, *T. elongata*, *T. littoralis*, *T. nitida*, *T. obtusifolia*, *T. stenantha*, *Pavetta Elmeri*, *P. multinervia*, *P. Williamsii*, *P. subferruginea*, *Timonius auriculatus*, *Urophyllum caudatum*, *U. affine*, *U. panayense*, *U. quadribacteolatum*, *Williamsia panayensis*, and *W. longistipula*. The status of *Tarenna* is discussed and 31 Philippine and Indo-Malayan species are enumerated, with the following new names: *T. angustifolia* (*Stylocoryna angustifolia* King), *T. adpressa* (*Stylocoryna adpressa* King), *T. Maingayi* (*Webera Maingayi* Hook. f.), *T. costata* (*Stylocoryna costata* Miq.), *T. pumila* (*Webera pumila* Hook. f.), and *T. buruensis* (*Stylocoryna buruensis* Bartl.).—E. D. Merrill.

2209. OSTERHOUT, GEO. E. *Two new plants from western Colorado.* Bull. Torrey Bot. Club 49: 183-184. 1922.—*Nuttallia marginata* and *Acrolasia humilis* are described as new species.—P. A. Munz.

2210. RADLKOFER, L. *Sapindaceae novae Philippinenses.* Philippine Jour. Sci. 20: 657-662. 1922.—The following new species are described: *Lepisanthes acutissima*, *L. macrocarpa*, *Hedyachras* gen. nov., *H. philippinensis*, *Trigonachras falcatocuspidata*, and *Mischocarpus sublaevis*. An amplified description of *Euphorianthus obtusatus* Radlk., Mindanao-Celebes, is given.—E. D. Merrill.

2211. RENDLE, A. B., E. G. Baker, and S. LE M. MOORE. *A systematic account of the plants collected in New Caledonia and the Isle of Pines by Prof. R. H. Compton, M. A., in 1914.* Part 1. Flowering plants (angiosperms). Jour. Linn. Soc. Bot. London 45: 245-418. Pl. 13-24. 1921.—The paper enumerates 830 species, 230 of which are new, and there are 10 new genera. There are many peculiar endemic forms, and many species are recorded from the island for the 1st time. Much information is presented concerning the distribution of the flora of the region. The families represented by the largest number of species are the Orchidaceae, Euphorbiaceae, Rubiaceae, and Myrtaceae; the families Leguminosae, Saxifragaceae, and Apocynaceae are well represented. The new genera are *Comptonella* (Rutaceae),

Salaciopsis (Celastrineae), **Montagueia** (Anacardiaceae) (commemorating the late Mr. P. D. Montague, zoologist to the expedition), **Paracryphia** (Eucryphiaceae), **Enochoria** (Araliaceae), **Merismostigma** (Rubiaceae), **Tropalanthus** (Sapotaceae), **Depanthus** (Gesneraceae), **Adenodaphne** (Lauraceae), and **Dendrophyllanthus** (Euphorbiaceae). The new species are as follows: **MONOCOTYLEDONS** (by A. B. Rendle, who is each case is authority for the species). *Dendrobium Comptonii*, *Bulbophyllum lingulatum*, *B. Comptonii*, *Phreatia Comptonii*, *Phajus neocaledonicus*, *Calanthe oreadam*, *C. neocaledonica*, *Sarcochilus neocaledonicus*, *Acianthus nanus*, *A. culiciferus*, *A. bracteatus*, *A. corniculatus*, *Campynema neocaledonicum*, *Freycinetia Comptonii*, *F. monticola*, *Eriocaulon Comptonii*, *Costularia neocaledonica*, *Scleria neocaledonica*.—**DICOTYLEDONS**, **Polypetalae** (by E. G. Baker, who in each case is authority for the species): *Hibbertia Comptonii*, *H. dissitiflora*, *H. insulana*, *Drimys Comptonii*, *D. odorata*, *D. pauciflora*, *Ionidium serratum*, *Agation rufo-tomentosum*, *A. longipedicellatum*, *A. Comptonii*, *Pittosporum penduliflorum*, *Garcinia Comptonii*, *Microsema Comptonii*, *Sterculia Comptonii*, *Elaeocarpus nodosus*, *E. toninensis*, *E. dolichopodus*, *E. Comptonii*, *Ryssopteris taomensis*, *Boronella parvifolia*, *Melicope platystemon*, *M. montana*, *Comptonella albiflora*, *Evodia canalisensis*, *E. lactea*, *Zanthoxylon neocaledonicum*, *Z. albiflorum*, *Dutailleya Comptonii*, *Murraya flava*, *Dysoxylum Comptonii*, *D. gamosepalum*, *Sphenostemon Comptonii*, *Salaciopsis neocaledonica*, *Euroschinus rubromarginatus*, *E. sylvicola*, *Montagueia haplostemon*, *Semecarpus ngoyensis*, *Arthroclanthus grandifolius*, *A. Comptonii*, *Phaseolus neocaledonicus*, *Mucuna neocaledonica*, *Storkiella Comptonii*, *Albizia Comptonii*, *Parinarium neocaledonicum*, *P. minutiflorum*, *Geissois magnifica*, *Codia tinifolia*, *Pancheria rubrivenia*, *P. communis*, *Spiraeanthemum Comptonii*, *S. rubescens*, *Polysoma Comptonii*, *Paracryphia suaveolens*, *Terminalia rubricarpa*, *Cloezia Comptonii*, *C. angustifolia*, *Myrtus proliza*, *M. luteoviridis*, *Eugenia gyrosepala*, *E. angustibracteolata*, *E. mouensis*, *E. stephanophylla*, *E. brachycalyx*, *E. hydrophila*, *E. ignambiensis*, *E. arborea*, *E. Comptonii*, *E. neocaledonica*, *E. toninensis*, *E. paniensis*, *Psidium kuakuense*, *Casearia Comptonii*, *Homalium sylvicolum*, *Schefflera combouiensis*, *S. Comptonii*, *Dizygotheca polyantha*, *Eremopanax canalisensis*, *Enochoria sylvicola*, *Apiopetalum arboreum*. **DICOTYLEDONS**, **Gametatae** (by S. Le M. Moore, who in every case is authority for the species): *Bikkia fulgida*, *B. alyxioides*, *B. truncata*, *B. Comptonii*, *Lucinaea neocaledonica*, *Randia Comptonii*, *Gardenia cerifera*, *G. sylvestris*, *Atractocarpus cucumicarpus*, *A. oblongus*, *Cyclophyllum cymosum*, *Merismostigma neocaledonicum*, *Ixora kuakuensis*, *I. florida*, *I. Comptonii*, *Morinda ligustrina*, *Psychotria suaveolens*, *P. Comptonii*, *P. frondosa*, *P. pubituba*, *P. declieuxioides*, *P. laxissima*, *P. subpallens*, *P. rarifolia*, *P. roseo-tincta*, *P. lepidocalyx*, *P. toninensis*, *P. gneissica*, *P. patula*, *Cephaelis saltiensis*, *C. rubefacta*, *C. bowardioides*, *Lagenophora neocaledonica*, *Erigeron neocaledonicus*, *Blumea canalisensis*, *Scaevola rotundata*, *Dracophyllum compactum*, *Rapanea grandifolia*, *Chrysophyllum gordoniaefolium*, *C. floribundum*, *C. Comptonii*, *C. peninsulare*, *Planchonella serpentina*, *P. saligna*, *Palaquium neocaledonicum*, *Tropalanthus Sealyae*, *T. Comptonii*, *Symplocos calophylloides*, *S. munda*, *Melodinus paucivenosus*, *M. citricarpus*, *Rauwolfia suaveolens*, *Alyxia nummularia*, *A. Johnsoniae*, *A. serpentina*, *Pterochrosia Comptonii*, *P. neriifolia*, *Alstonia lanceolifera*, *A. retusa*, *A. Comptonii*, *A. saligna*, *Parsonsia Comptonii*, *P. effusa*, *P. taomensis*, *Tylophora insulicola*, *Marsdenia assimulata*, *Hoya limoniaca*, *Geniostoma lopeziaefolium*, *G. consimile*, *G. sluggeoides*, *G. oleifolium*, *Lindernia neocaledonica*, *Depanthus glaber* (*Coronanthus glabra* C. B. Clarke), *Pseuderanthemum Comptonii*, *Justica pinensis*, *Myoporum rotundatum*, *Gmelina neocaledonica*, *Oxera crassiflora*, *O. Comptonii*, *O. gmelinoides*. **MONOCHLAMYDEAE** (by S. Le M. Moore, who, except where otherwise indicated, is authority for the species): *Timeroa canalisensis*, *Atriplex jubata*, *Nepenthes humilis*, *Piper Comptonii*, *Hedycarya saligna*, *H. Engleriana*, *H. Comptonii*, *H. symplocoides*, *H. Perkinsiana*, *Trimenia neocaledonica* Bak. fil., *Adenodaphne corifolia*, *Litsea neocaledonica*, *Beauprea multijuga*, *B. Comptonii*, *Grevillea acervata*, *G. Comptonii*, *G. producta*, *Stenocarpus Comptonii*, *S. phyllodineus*, *Loranthus pustulatus*, *L. glaucescens*, *L. Comptonii*, *L. canalisensis*, *L. angustiflorus*, *Exocarpus dilatatus*, *Ricinocarpus neocaledonicus*, *Dendrophyllanthus Comptonii*, *Phyllanthus triquetrus*, *P. durus*, *P. rhodocladus*, *P. induratus*, *P. casearioides*, *P. Comptonii*, *P. salacioides*, *P. maytenifolius*, *P. serpentinus*, *P. gneissicus*, *P. toninensis*, *P. pterocladus*, *P. castus*, *P. sylvicola*, *P. ligustrifolius*, *Acalypha finitima*, *Cleidion viridiflorum*, *C. sylvestre*, *C. panduratum*, *C. Comptonii*, *C. obovatum*, *C. paucidentatum*, *Macaranga longispica*, *M. mista*, *M. meiophylla*, *M. porrecta*, *Balanops reticulata*, *B. acicarpa*, *Ficus Comptonii*, *F. leptorhachis*, *F. oreadam*, *F. cretacea*, *F. campicola*.—A. J. Eames.

2212. ROBINSON, B. L. *Dyscritothamnus*, a new genus of Compositae. *Contrib. Gray Herb.* 65: 24-28. Pl. 1. 1922.—*Dyscritothamnus* is described as a genus of Compositae new to science. To it is assigned one species, *D. filifolius*. It is based upon a somewhat fragmentary specimen collected in 1840 by Ehrenberg near the boundary between Queretaro and Hidalgo in Mexico. It seems to be intermediate in relationship between the Eupatorieae and the Astereae but is tentatively referred to the former.—E. B. Payson.

2213. ROBINSON, B. L. Records preliminary to a general treatment of the Eupatorieae II. *Contrib. Gray Herb.* 65: 46-54. 1922.—The following species and varieties are described as new to science: *Eupatorium angulifolium*, *E. angulifolium* vars. *typicum* and *fratri*, *E. elegans* HBK. vars. *typicum* and *pubens*, *E. neriifolium*, *E. militare*, *E. sagittiferum*, and *Kanimia microphylla*. *Eupatorium subpenninervium* Sch. Bip. and *E. viscosum* HBK. are discussed.—E. B. Payson.

2214. ROWLEE, W. W. The genus *Costus* in Central America. *Bull. Torrey Bot. Club* 49: 283-292. Pl. 12-15. 1922.—A key to the Central American species of *Costus* is given with a discussion of the species, of which the following new ones are described: *C. bracteatus*, *C. sepauculensis*, and *C. congestus*.—P. A. Munz.

2215. RUSBY, H. H. New species of trees of medical interest from Bolivia. *Bull. Torrey Bot. Club* 49: 259-264. 1922.—The following new species are published: *Nectandra coto*, *Ocotea pseudo-coto*, *Aerodiclidium benense*, *Guarea Bangii*, and *G. alborosea*. The bark of the 1st one named is the source of "coto," that of the 2nd is sold as such but is worthless; the 4th furnishes spurious "cocillana."—P. A. Munz.

2216. SCHLECHTER, R. Orchidaceae Bradeanae Paulenses. *Anexos Mem. Inst. Butantan [Bot.]* 14: 1-68. Pl. 1-14, and frontispiece. 1922.—This paper is published as part of the Contributions to the Knowledge of the Orchid Flora of Brazil under the joint authorship of R. SCHLECHTER and F. C. HOEHNE. In the present paper, however, the senior author alone treats of an orchid collection made in the state of São Paulo, Brazil, by Alexandre Curt Brade. Much additional information is given concerning species previously described and the following new genera, species, and varieties are characterized: *Habenaria Bradei*, *H. polyrhiza*, *Pogonia paulensis*, *P. fragrans*, *Vanilla angustipetala*, *Pelexia septrum*, *P. laminata*, *Cyclopogon graciliscapa*, *C. Bradei*, *C. iguapensis*, *C. saxicolus*, *C. paulensis*, *C. multiflorus*, *Sarcoglottis tenuis*, *Stenorrhynchus Bradei*, *Craniches Bradei*, *Physurus longicalcaratus*, *Pseudostelis* n. gen., *P. spiralis* (*Pysosiphon spiralis* Ldl.), *P. deregularis* (*Stelis deregularis* Rdr.), *P. Bradei*, *Physosiphon Bradei*, *Pleurothallis Bradei*, *P. subpicta*, *P. Curtii*, *P. transparens*, *P. Dryadum*, *P. sororcula*, *P. iguapensis*, *P. Alexandri*, *Octomeria similis*, *O. iguapensis*, *O. Bradei*, *O. gracilis* Lodd. var. *paulensis*, *O. Alexandri*, *Fractiunguis* n. gen., *F. reflexa* (*Hexisea reflexa* Reichb. f.), *F. brasiliensis*, *Epidendrum Alexandri*, *E. iguapensis*, *Eulophia longifolia* (HBK.) Schltr. var. *flavescens*, *Promenaea paulensis*, *Dipteranthus Bradei*, *Dichaea Cogniauxiana*, *Campylocentrum pubirachis*.—E. B. Payson.

2217. SCHNEIDER, CAMILLO. Notes on American willows, XII. *Jour. Arnold Arboretum* 2: 61-121. 1921 [1922].—This article concludes the series of papers on American willows by this author [see Bot. Absts. 1, Entries 801, 813; 3, Entries 1838, 1839; 4, Entries 1769, 1770; 7, Entries 1490, 2238, 2239; 8, Entry 741; 11, Entry 3236].—It starts with a systematic enumeration of the sections, species, varieties, and forms of American willows; 116 species belonging to 23 sections are enumerated. This is followed by remarks on the hybrids of American willows hitherto observed and by remarks on the geographical distribution of American willows which consist chiefly of an enumeration under each state, province, or country of the species known to occur there. Analytical keys to the species of American willows form the 4th part of the article; 3 keys are provided, 1 for the determination of staminate specimens, 1 for pistillate specimens, and 1 for leaf specimens. An index to all the sections, species, varieties, and forms mentioned in the 12 papers constituting the series concludes the article. The following new names and combinations are proposed: *Salix arctica* f. *diplodictya* (Trautv.) S. Rebbiana f.

luxurians (Fern.) f. *capreifolia* (Fern.), var. *projecta* (Fern.), *S. pedicellaris* f. *tenuescens* (Fern.), *S. Scouleriana* f. *poikila* (Schneid.), \times *S. Glatfelteri* (*S. amygdaloides* \times *nigra*), \times *S. Grayi* (*S. argyrocalyx* \times *planifolia*), \times *S. gaspeensis* (*S. brachycarpa* \times *chlorolepis*), and sect. *Mexicanae*.—Alfred Rehder.

2218. SCHULZ, O. E. *Cruciferae-Brassicaceae (pars prima)*. Das Pflanzenreich Heft 70. (IV, 105). 290 p., fig. 1-35. 1919.—In the present part the author treats the first 2 subtribes of the *Brassicaceae*, namely the *Brassicinae* and the *Raphaninae*. An extensive bibliography is included of papers dealing with the taxonomy, morphology, and anatomy of a larger or smaller number of species of these 2 subtribes. There is presented also a concise account of the general vegetative characteristics, the anatomy, the floral structure, the pollination, and the structure of the fruits, seeds and embryos of the plants considered in this paper. The *Brassicaceae* find their center of distribution in the Mediterranean region. In the western part of this region occur many highly differentiated and mostly monotypic genera. All the species of the 2 subtribes are native to the old world. Twenty-eight genera receive recognition and are treated in great detail. Keys are given to the subtribes, genera, and species. For each species a bibliography is given which includes the synonymy of the species; a lengthy description and statement of geographical distribution with the citation of some specimens also occurs. The principal genera treated are *Brassica* with 33 species, *Erucastrum* with 15, *Sinapis* with 8, *Diplotaxis* with 19, *Raphanus* with 8, and *Crambe* with 19. The following new species and specific combinations occur: *Brassica atlantica* (*B. oleracea* L. var. *insularis* (Moris) subvar. *atlantica* Coss.), *B. cadmea* v. Heldreich ms., and *Sinapodendron palmense* (*Brassica palmensis* O. Ktze). In addition to these there are a very great number of new varieties and new varietal combinations as well as a smaller number of other subspecific novelties.—E. B. Payson.

2219. SMITH, CHARLES PIPER. *Studies in the genus Lupinus. VII. L. succulentus and L. niveus*. Bull. Torrey Bot. Club. 49: 197-206. Fig. 75-78. 1922.—For North American annuals and biennials, outside of a few Mexican and Costa Rican species, 6 groups are recognized: *Stiversiani*, *Succulenti*, *Sparsiflori*, *Micranthi*, *Concinni*, and *Subcarnosi*; a key is given distinguishing between these groups. In the *Succulenti*, *Lupinus succulentus* Dougl. is used for the plant commonly known as *L. affinis* Agardh, a name which belongs to another species. *L. succulentus* Layneae and *L. succulentus* Brandegeii are described as new varieties. Under the *Micranthi* only *L. niveus* Wats. is treated in this paper.—P. A. Munz.

2220. THARP, B. C. *Commelinantia*, a new genus of the Commelinaceae. Bull. Torrey Bot. Club 49: 269-275. Pl. 10-11. 1922.—*Commelinantia* n. gen. is published for *C. anomala* (Torr.) n. comb., based on *Tradescantia anomala* Torr.—P. A. Munz.

2221. WEATHERBY, C. A. A new species of *Eleocharis* from Massachusetts. Rhodora 24: 23-26. 1922.—*Eleocharis fallax* n. sp., from Cape Cod, Massachusetts, an isolated northern representative of *E. arenicola* Torr. (South Carolina to California and Guatemala), *E. montana* (HBK.) R. & S. (tropical America), *E. Dombeyana* Kunth (Andes from Ecuador to Bolivia), and *E. truncata* Schlecht. (Mexico) are discussed and their diagnostic characters presented in a key.—M. L. Fernald.

2222. WIEGAND, K. M. *Carex laxiflora* and its relatives. Rhodora 24: 189-201. 1922.—This is a monographic revision of the group. The following are described and discussed: *C. albursina* Sheldon, *C. blanda* Dewey, *C. laxiflora* Lam., *C. ormostachya* n. sp., *C. crebriflora* n. sp., *C. ignota* Dewey, *C. anceps* Muhl., *C. striatula* Michx., *C. styloflexa* Buckley, *C. styloflexa* var. *fusiformis* (Chapm.) n. comb. based on *C. fusiformis* Chapm., *C. styloflexa* var. *remotiflora* n. var., *C. leptonervia* Fernald.—M. L. Fernald.

2223. WIEGAND, K. M. Notes on some East-American species of *Bromus*. Rhodora 24: 89-92. 1922.—Keys are given to the introduced species of the *Bromus secalinus* affinity and

to the native species of the *B. ciliatus* group. The following are discussed: *B. secalinus* L., *B. secalinus* f. *hirtus* (F. Schultz) n. comb. based on *B. mutabilis* ♂ *hirtus* F. Schultz, *B. racemosus* L., *B. commutatus* Schrad., *B. hordeaceus* L., *B. hordeaceus* f. *leptostachys* (Pers.) n. comb. based on *B. mollis* β. *leptostachys* Pers., *B. ciliatus* L., *B. ciliatus* f. *denudatus* n. f., *B. ciliatus* f. *laeviglumis* (Scribn.) n. comb. based on *B. ciliatus laeviglumis* Scribn., *B. altissimus* Pursh, *B. altissimus* f. *incanus* (Shear) n. comb. based on *B. purgans incanus* Shear, *B. purgans*, *B. purgans* f. *laevivaginata* n. f. and f. *glabriflorus* n. f.—M. L. Fernald.

2224. WIEGAND, K. M. Variations of *Carex annectans*. *Rhodora* 24: 73-74. 1922.—The 2 plants originally proposed by Bicknell as *Carex xanthocarpa* (1896) and *C. xanthocarpa annectans* (1896) prove to have well defined ranges, and are maintained as geographic varieties. The earlier *C. xanthocarpa* Degland (1807) necessitates the taking up of *C. annectans* Bicknell (1908) and the new combination *C. annectans* var. *xanthocarpa* (Bicknell) Wiegand.—M. L. Fernald.

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12

MAY, 1923
ENTRIES 2225-2899

No. 4

AGRONOMY

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MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 2343, 2403, 2404, 2412, 2416, 2422, 2436, 2437, 2442, 2494, 2508, 2622, 2674, 2675, 2680, 2687, 2693, 2792, 2793, 2795, 2821, 2822, 2827, 2829, 2831, 2833, 2839, 2842, 2891)

2225. ANONYMOUS. A novel method of growing potatoes. Agric. Gaz. New South Wales 33: 778. 1 fig. 1922.—Young plants were clipped and transplanted after having been planted some time. One tuber gave a crop of 126 pounds.—*L. R. Waldron*.

2226. ANONYMOUS. Efwatakala grass (*Melinis minutiflora*), how it eradicated plantation weeds. Tropic. Life 18: 128. 1922.—The article is a quotation from an account in the Rev. Agric. Tropic, San Salvador of a farmer's experience in eradicating Johnson grass, *Holcus halapense*, from his cultivated fields. Finding it almost impossible to destroy the Johnson grass by cultivation he seeded the fields to Efwatakala grass and the latter occupied the ground so fully that the Johnson grass was killed out. He then proceeded to destroy the Efwatakala by cultivation. Eradication of this grass was easy on account of its fibrous root system. This method of eradicating persistent weeds would appear of considerable value in tropical and sub-tropical regions. Note: The grass *Melinis minutiflora* is known as "Molasses grass" in the United States and as "Gordura grass" in Brazil where it is abundant. [See also Bot. Absts. 11, Entry 3298.]—*H. N. Vinall*.

2227. ANONYMOUS. Field experiments with peanuts. Grafton and Wollongbar experiment farms, 1921-22. Agric. Gaz. New South Wales 33: 793-794. 1922.—Peanut varieties used were Chinese, White Spanish, and Valencia. Planting was done late in September and the crop was harvested in March and April. The maximum yield of 2,165 pounds of nuts per acre was secured from White Spanish at Wollongbar. There is very little local demand for the crop.—*L. R. Waldron*.

2228. ANONYMOUS. Kieselsäure als Phosphorsäureersatz. [Silicic acid as a substitute for phosphoric acid.] [Rev. of: LEMMERMANN, OTTO. Die ertragsteigernde Wirkung der Kieselsäure bei unzureichender Phosphorsäuredüngung. Sonderabdruck a. d. Zeitschr. Pflanzenernähr. u. Düng. 8 vo, 72 p. 1922.] Wiener Landw. Zeitg. 72: 395-396. 1922 [1923].—Silicon in certain forms appears to be directly utilized by the plant, and an increase of yield is noted particularly

when the fertilizer is somewhat deficient in phosphoric acid but potash and nitrogen are supplied in the requisite quantities. The most favorable form of silicon was colloidal silicic acid; phonolith was without action and kieselguhr was injurious. The investigation was carried on in quartz sand and soil cultures, and the results confirmed in the field. The action of silicic acid fertilizer is held to be directly on the plant, as opposed to the conclusion first arrived at at Rothamsted that phosphates are thereby only rendered more readily assimilable. The importance of these findings, in view of the shortage of phosphates in central Europe, is emphasized.—*F. Weiss.*

2229. ANONYMOUS. *Verslag over het jaar 1921.* [Report for the year 1921.] Dept. Landb. Suriname 94 p. Paramaribo, 1922.—At the experiment station 297 hectares were planted in coffee. The growth of the plants was generally good, and the seed beds furnished sufficient material. A part of the land was at first planted with bacove as shade, later followed by coffee. The cocopalm plantation suffered considerably from heart rot. The breeding of coffee and cocoa is of much importance, and large numbers of budded and grafted plants are available. Fermentation of coffee bean shows some difficulties: instead of being complete in 4 days, the process is sometimes not concluded in 6 days or even more. By the addition of sour milk, however, fermentation may be finished in 1-3 days, and this new process is followed by several plantation owners.—Further short reports are given on malachra, okra, *Hibiscus cannabinus*, *H. sabdariffa*, rice, corn, bananas, citrus fruits, and forestry activities.—*J. C. Th. Uphof.*

2230. ARNY, A. C. *Border effect and ways of avoiding it.* Jour. Amer. Soc. Agron. 14: 266-278. 1922.—Experiments show that the removal of border rows is necessary in order to secure reliable results. However, under certain conditions this operation may not be necessary. Careful experimentation over a period of years is the only way to determine this point.—*F. M. Schertz.*

2231. BATTEN, E. T. *Experiments with cotton and peanuts.* Virginia Agric. Exp. Sta. Bull. 229. 22 p., 5 fig. 1922.—The 8 years' experiments were conducted at Holland, Virginia. Lime was found to be beneficial and should be applied to all soils in the locality once in 4 years. Fertilizer should not be applied directly to peanuts except on the poorer soils where acid phosphate and cottonseed meal, or other organic source of nitrogen, are recommended. Cotton should receive nitrogen, phosphorous, and potash, especially the latter. Nitrogen should be used sparingly on the richer soils and must be balanced with phosphorous to insure early maturity. A complete fertilizer, analyzing 4-8-2, is profitable for the corn crop. Soy beans should be included in the rotation, either as a separate crop or planted in the corn.—*F. D. Fromme.*

2232. BAUER, FRANZ. *Ueber Kunstdüngung.* [Use of artificial fertilizers.] Wiener Landw. Zeitg. 72: 78-79. 1 fig. 1922.—Practically all of Austria's needs for artificial fertilizers, must be met by importation. Owing to the high price of imported fertilizer, and to prevent the sale of worthless products, the manufacture of a mixed fertilizer has been undertaken under state auspices. A diagram showing the artificial fertilizers which may or may not be mixed before application, and recommendations for rates of application are given.—*F. Weiss.*

2233. BEAVEN, E. S. *Trials of new varieties of cereals. Part II.* Jour. Ministry Agric. Great Britain 29: 436-444. 1922.—A description is given of the "half-drill-strip" method of sowing cereals designed to reduce the probable error of the results of trials of new races.—*M. B. McKay.*

2234. BIDWELL, GEORGE L., LESLIE E. BOPST, and JOHN D. BOWLING. *A physical and chemical study of milo and feterita kernels.* U. S. Dept. Agric., Bull. 1129. 8 p. 1922.—On the whole, kafir, milo, and feterita resemble one another in composition and appearance. Aside from their food value for man and domestic animals, they may possibly be used com-

mercially in the manufacture of starch, sirup, alcohol, and oil, when proper machinery and processes have been devised, but probably not for malting purposes.—*J. T. Buchholz.*

2235. BLAIR, A. W. **Agricultural and commercial values of nitrogenous plant foods.** Jour. Amer. Soc. Agron. 14: 162-167. 1922.—No greater returns have been received from the use of organic forms of nitrogen than from inorganic forms, and it has cost the farmer more. The ready availability of nitrate has had much to do with the larger yields where nitrate was used. The commercial values of organic materials should be made more in accordance with their agricultural values.—*F. M. Schertz.*

2236. BLAKELY, W. F. **Weeds of New South Wales.** Agric. Gaz. New South Wales 33: 815-817. 1 fig. 1922.—Tumbling mustard (*Sisymbrium altissimum*) was first collected at Cudal in 1920. The plant is figured and described, and methods of control are suggested.—*L. R. Waldron.*

2237. BROWN, B. A. **Plot competition with potatoes.** Jour. Amer. Soc. Agron. 14: 257-258. 1922.—Experiments show that apparently yields of potatoes are not influenced by competition between single-row plots.—*F. M. Schertz.*

2238. BROWN, B. E. **Effect of borax in fertilizer on the growth and yield of potatoes.** U. S. Dept. Agric. Bull. 998. 8 p. 1922.—Results of these experiments, conducted on Caribou loam, Aroostook County, Maine, showed that definite injury occurred with an application as low as 5 pounds of borax per acre when the borax was put in the furrows and the planting done immediately. Some of the reactions with borax were: failure of the seed piece to germinate; killing of sprouts; absence of roots on seed pieces; general weakness of plants which come through the ground; bleaching of the foliage; poor stand and low yields.—*J. T. Buchholz.*

2239. CHALONS. **Beiträge zur Sorteneinteilung von Weizen und Roggen unter besonderer Berücksichtigung der Halmanordnungen.** [Contribution to the variety separation of wheat and rye, with special reference to blade arrangement.] Landw. Jahrb. 57: 667-677. 1922.—On analyzing varieties of winter and summer wheats and rye, the author demonstrated that the thickness of the spikelet is subject to great variations within the individual plants and therefore can not be used as a basis of variety differentiation, as suggested by Moebins and Derlitzki. The size and arrangements of blades, however, are of importance, especially between the main blade and that of the second order.—*S. A. Waksman.*

2240. CHAMBLISS, CHAS. E., and J. MITCHELL JENKINS. **Some new varieties of rice.** U. S. Dept. Agric. Bull. 1127. 17 p., 4 pl. 1923.—“This bulletin includes a description of the rice plant, and a botanical and agronomic description of 7 new varieties that have been developed in the course of cooperative experiments at the Rice Experiment Station, Crowley, Louisiana, and of 4 varieties now widely grown in this country. The agronomic performance and adaptation of each variety, including a full description of the conditions under which the experiments were conducted, are discussed in detail. The commercial value of the milled rice of the new varieties from a culinary standpoint is indicated.”—*J. T. Buchholz.*

2241. COLLINS, S. H., and B. THOMAS. **The sugars and albuminoids of oat straw.** Jour. Agric. Sci. 12: 280-286. 1922.—“Fine weather” during harvesting is essential for obtaining high percentages of sugar which gradually disappears from straw after harvest. The loss is very rapid if straw becomes damp. The amount of albuminoids in oat straw is largely conditioned by the amount of nitrogen in the soil, but the amount of grain produced is also a factor. By proper management, oat straw of much higher feeding value can be obtained.—*V. H. Young.*

2242. CONNER, S. D. **Nitrogen in relation to crop production in the middle west.** Jour. Amer. Soc. Agron. 14: 179-182. 1922.—The nitrogen problem is the most important soil

fertility problem before the corn belt farmers. Average Indiana soils have lost 20-40 pounds of nitrogen per acre per year for the last half century. Legumes and manure are needed. Much of the profit in the use of lime, phosphate, and potash is in the beneficial effect on legumes.—*F. M. Schertz.*

2243. DAVIDSON, J. D., and R. G. STAPLEDON. **Failure of Black Yeo oats in Glamorgan in 1921.** Jour. Ministry Agric. Great Britain 29: 465-469. 1922.—On 10 farms spring-sown Black Yeo oats, with seed from the same source, failed in spite of the fact that the seed was quite normal in appearance, gave no evidence of defect, and on test had germinated 97 per cent. The failure was due in part to unfavorable climatic conditions and to the fact that the variety is a winter variety; but chiefly because the seed were defective in some physiological respect which rendered them particularly susceptible to the influence of drought. This defect was strikingly revealed by a differential germination test conducted in soil in pots in which normal, half, quarter, and double waterings were used. The results secured indicate that differential germination "tests conducted under conditions less favorable to germination and growth than ordinary conditions are competent to reveal defects in a sample that might be overlooked if only the ordinary test was conducted and to bring out such defects more prominently."—*M. B. McKay.*

2244. DAVIDSON, JEHIEL. **The effect of nitrates applied at different stages of growth on the yield, composition and quality of wheat.** Jour. Amer. Soc. Agron. 14: 118-122. 1922.—The effectiveness of nitrates in increasing yields consistently decreases as the time of application approaches the stage of heading. The effectiveness of nitrates in increasing the protein content ($N \times 5.7$) of the grain increases as their effectiveness in increasing the yield decreases.—*F. M. Schertz.*

2245. ELLETT, W. B., and T. K. WOLFE. **The effect of fertilizers on yield and market conditions of corn.** Jour. Amer. Soc. Agron. 14: 153-158. 1922.—Under the experimental conditions it appeared that phosphates and stable manures are the most valuable materials used for increasing the yield and quality of the corn crop. Organic matter in the form of green manure, as well as in the form of stable manure, has been valuable in increasing yield.—*F. M. Schertz.*

2246. FENTON, E. W. **Spotted medick.** Jour. Ministry Agric. Great Britain 29: 643-648. 2 fig. 1922.—Spotted medick (*Medicago arabica* All.; *M. maculata* Sibth.), a troublesome weed in meadow and pasture lands, has apparently been recently introduced into certain areas in wool, shoddy, and wool cleanings. It may be eradicated by dusting—preferably in early spring—with sulphate of ammonia at the rate of 5-12 ounces of the dust to 8 square yards of ground surface.—*M. B. McKay.*

2247. GARVER, SAMUEL. **Alfalfa root studies.** U. S. Dept. Agric. Bull. 1087. 28 p., 19 fig. 1922.—Studies were made at Redfield, South Dakota, on 7 varieties of alfalfa seeded at the same time and grown under the same soil moisture conditions. The root systems of the least hardy forms of purple-flowered alfalfa may be distinguished from the most hardy hybrid and yellow-flowered alfalfas with accuracy. The intermediate forms, however, are not sufficiently distinct to be distinguishable from one another or invariably from some forms of the non-hardy or of the yellow-flowered alfalfas. Factors tending to produce modification of tap roots in alfalfa are soil, climate, cultural treatment, and injuries.—*J. T. Buchholz.*

2248. GERICKE, W. F. **Studies on the effect of nitrogen applied to oats at different periods of growth.** Jour. Amer. Soc. Agron. 14: 312-320. 1922.—The paper reports the effect of N applied to oats at different periods of growth, on time of maturing of the plants, on the height and number of stalks produced, on production of dry matter, and on the protein content of the grain.—*F. M. Schertz.*

2249. GRAEBER, L. F. Scarification as it affects longevity of alfalfa seed. Jour. Amer. Soc. Agron. 14: 298-302. 1922.—The data indicate clearly that scarification exposes alfalfa seed to factors which cause a far more rapid decrease in viability than normally obtains with the untreated seed. To obtain best results, seed should be scarified shortly before seeding.—*F. M. Schertz.*

2250. HASKELL, S. B. A study of present and future supplies of fertilizer nitrogen. Jour. Amer. Soc. Agron. 14: 167-178. 1922.—A general review of the nitrogen situation is presented.—*F. M. Schertz.*

2251. HAYES, H. K., and A. N. WILCOX. The physiological value of smooth-awned barleys. Jour. Amer. Soc. Agron. 14: 113-118. 1922.—Comparative yield tests and comparative studies in threshing yard-square plots and also rod or head rows. Three men threshed and cleaned 120 samples per hour, recording weights of both straw and grain. A detailed description of the machine is given together with drawings.—*F. M. Schertz.*

2252. JENSEN, O. F. and M. E. OLSON. A small grain nursery thresher. Jour. Amer. Soc. Agron. 14: 110-112. 1922.—A small grain thresher is described which the authors find convenient in threshing yard-square plots and also rod or head rows. Three men threshed and cleaned 120 samples per hour, recording weights of both straw and grain. A detailed description of the machine is given together with drawings.—*Roland McKee.*

2253. KEMP, W. B. An index for measuring the performance of wheat varieties and strains. Jour. Amer. Soc. Agron. 14: 258-265. 1922.—The index is an aid to measuring the progress that has been made in variety testing and selection or breeding of wheat and other small grains.—*F. M. Schertz.*

2254. KERLE, W. D. The Clarence River maize growing contest. Agric. Gaz. New South Wales 33: 779-782. 1922.—Nine farmers competed, the crops being grown in each case under comparable conditions upon 2 farms. The plots securing 1st prize were planted to a local variety and gave an average yield of 94 bushels per acre.—*L. R. Waldron.*

2255. KNIERTEM, W. VON. Düngungsversuche mit verschiedenen neueren Stickstoffdüngemitteln. [Fertilizer experiments with various new nitrogenous fertilizers.] Mittell. Deutsch. Landw. Ges. 37: 654-655. 1922.—The writer reports the results of a test with urea, ammonium sulphate, and ammonium sulphate-nitrate on potatoes and beets. All plots received equal amounts of nitrogen in the above mentioned forms. The plot receiving urea gave the highest yield. Similar results were secured with sugar beets. In view of the high nitrogen content of urea (46 per cent) its use is advised since small quantities cover considerable areas.—*A. J. Pieters.*

2256. LAMBOURNE, J. Local production of gingelly as a catch crop. Malayan Agric. Jour. 10: 94-99. 1922.—It is shown that *Sesamum indicum* can be grown as a crop in the Malay Peninsula. The seed sown was of mixed races, which reduces the value of the experiment; it is not even clear that early races only were in the crop, though early races were present as the period from sowing to harvesting was 109 days. The constants of the oil obtained are given.—*I. H. Burkill.*

2257. LING, ARTHUR R. Sugar technology. [Rev. of: (1) DEERR, NOËL. Cane sugar: A text book on the agriculture of the sugar cane. The manufacture of cane sugar and the analysis of sugar house products. 2nd ed., rev. and enlarged, viii + 644 p., 29 pl. Norman Rodger: London, 1921. (2) JONES, LLEWELLYN, and FREDERIC I. SCARD. The manufacture of cane sugar. 2nd ed., xix + 481 p., 270 pl. Duckworth & Co.: London, 1921. (3) MURKE, F. Condensed description of the manufacture of beet sugar. v + 175 p. John Wiley and Sons: New York; Chapman and Hall: London. 1921.] Nature 110: 4-5. 1922.—The reviewer

regards the first 2 books as comprehensive and authoritative. The 3rd is intended for factory superintendents, etc., and scarcely desirable as an elementary textbook on the subject.—O. A. Stevens.

2258. LIPSCHÜTZ, H. Versuchsergebnisse mit Phosphathumus und Stickstoffhumus. [Experiments with phosphorus- and nitrogen-containing humus.] Wiener Landw. Zeitg. 72: 19-21. 1921.—The use of these fertilizers is claimed to have given greater yields of potatoes, mangels, and wheat, even in an abnormally dry year like 1921, than were obtainable by the use of mineral fertilizers alone. The particular value of these humus fertilizers is ascribed to the contained organic matter and soil-modifying bacteria.—F. Weiss.

2259. MCCOOL, M. M., and PAUL M. HARMER. Effect of fertilization on the growth of sugar beets on some Michigan muck soils. Jour. Amer. Soc. Agron. 14: 228-234. 1922.—A study is reported on the effect of fertilizers on tonnage, sugar content, and percent of purity of beets.—F. M. Schertz.

2260. MAKIN, R. N. Farmers' experiment plots. Maize experiments, 1921-22. South coast. Agric. Gaz. New South Wales 33: 790-792. 1922.—Trials for grain yields were conducted on 5 private farms. The maximum yield, 150 bushels per acre, was secured from Funk's yellow dent corn. Superphosphate gave best results in manurial trials.—L. R. Waldron.

2261. MARTIN, JOHN H. Experiments with cereals on the Belle Fourche Experiment Farm Newell, South Dakota. U. S. Dept. Agric. Bull. 1039. 72 p., 22 fig. 1922.—Experiments conducted on dry land for 12, and on irrigated land for 8, years are reported. The soil is a heavy, impervious clay known as Pierre clay. The seasonal precipitation is an important factor influencing the yield of grain. The best varieties of wheat, oats, and barley have yielded fairly well on dry land, but with complete or partial failure in some years. Varieties recommended for growing on dry land are: spring wheat,—Kubanka, Marquis; winter wheat,—Turkey, Kharkof; oats,—Kherson, Sixty-Day; barley,—White Smyrna, Hannechen. Winter wheat has produced higher average yields than spring wheat, but is uncertain due to winter-killing and soil blowing. The Kubanka is the highest yielding spring variety. On irrigated land the same wheat varieties are recommended. Winter wheat gives a slightly higher average yield than spring wheat. Other varieties recommended for irrigated land are: oats,—Silvermine, White Russian; barley,—Chevalier, Trebi; flax,—Damont, Reserve. Rate of seeding experiments are also reported, and recommendations made for the several varieties.—J. Lincoln Cartledge.

2262. MÜLLER, H. C., UND E. MOLZ. Versuche zur Erhöhung der Produktionskraft der Saatkartoffel. [Experiments on the increase of productivity of seed potatoes.] Landw. Jahrb. 57: 679-706. 1922.—Seed potatoes harvested when the vines were still green were distinguished by uniform germination, earlier growth, and larger yields in comparison with those harvested when the vines had died down. Plants injured in early development gave tubers with weakened productivity. Moderate shading produced results similar to early harvesting, the tubers being more productive than from plants grown in the light. Good light also increased the setting of tubers, while insufficient light diminished it and brought about more abundant leaf growth. Light and transpiration relations of the plant, which modify the starch content of the tubers, have an important influence upon the productivity of the seed potato. Also size of the seed potato, other things being equal, influences the yield.—S. A. Waksman.

2263. O'DWYER, MARGARET H. Preliminary report on the nutritive value of certain Australian grasses. Proc. Linn. Soc. New South Wales 46: 239-251. 1921.—Material was taken and air dried at (a) medium stage, halfway between beginning of shoot and flowering; (b) at early flowering; (c) when seed was quite set. Material was weighed at the farm as soon

as cut; this is responsible for certain inaccuracies due to lack of equipment. Rapid changes of material, especially those produced by wilting, are discussed. For analysis samples were ground fine enough to pass a 1 mm. sieve and stored in air tight bottles in the dark. The methods of the Association of Official [American] Agricultural Chemists (1919), were followed in the main. The effect of soil, season, and elevation was noted. Table 1 presents analyses of 3 specimens of *Danthonia semiannularis* Labill., 5 of *Schedonorus Hookerianus* Benth., and 2 of *Panicum prolutum* from different localities and soils. It also gives stage of growth, moisture content, ash, crude protein, true protein, crude fiber, ether extract, pentosans, carbohydrates, and albuminoid ratio. Table 2 shows the protein content at different stages of growth in 7 specimens of *Schedonorus Hookerianus*, 1 of *Panicum decompositum* R. Br., 4 of *P. prolutum*, 2 of *Eragrostis leptostachya*, 3 of *Danthonia semiannularis*, 1 of *D. pilosa* (?) R. Br., and 1 of *Pollinia fulva* Benth. Table 3 gives the protein content in the flowers of these species.—*Eloise Gerry*.

2264. PAERELS, J. J. Coirvezel. [Coconut fiber.] *Cultura* 34: 305-308. 1922.—After the settlement of the Hollanders in the Malayan Archipelago, the coconut fiber industry increased slightly until 1851, when, during the London exhibition, this product became better known. In Java, natives beat a section of the coat of the fruit until it becomes soft. This mass of fiber is soaked in water for 12 hours to loosen the "latek" or solid matter between the fibers and epidermis. After further beating the shortest fibers are removed by hand, then the entire mass is wrung. The fiber is dried in the sun, rolled by hand on a board, and later sorted into 2 types, both suitable for the production of rope. In Ceylon, on the other hand, a fermentation process is generally followed.—*J. C. Th. Uphof*.

2265. PAERELS, J. J. Vezel agave. [Fiber agave.] *Cultura* 74: 381-387. 1922.—The growing of agave for fiber is being developed in Dutch East India. *Agave sisalina*, *A. cantala*, and *A. fourcroydes* are cultivated. Harvesting in Java begins 3-4 years after the 2-year old plants have been planted. The older leaves are better for fiber production. Vertical leaves are not harvested, but those growing at an angle of 45° or more are cut. The dry period is the best for harvesting. In Java 3-4 cuttings are made a year, about 30 leaves to the plant are gathered, and 1000-1250 kgm., sometimes 2000, of fiber per bouw [0.70 hectare] are harvested.—*J. C. Th. Uphof*.

2266. PAWLIK, R. Ueber die Setzweite der Kartoffeln. [Concerning the planting distance for potatoes.] *Wiener Landw. Zeitg.* 72: 97. 1922.—Potatoes spaced about 20-30 cm. apart gave higher yields than those more closely or distantly planted. This requires about 20 bushels of seed per hectare.—*F. Weiss*.

2267. ROBERTSON, G. S. Field experiments with rock phosphates and basic slags. *Jour. Ministry Agric. Great Britain* 29: 519-530, 600-605. 10 fig. 1922.—"Rock phosphates produce exactly the same type of improvement in the quality of the hay crop and the pasture as the most soluble types of open hearth basic slag, and they are quite as effective in this respect. The open hearth low-soluble fluorspar slags are not so consistent in their behavior. The evidence suggests that the less soluble types do not improve the hay crops to the same extent as the high-soluble slags."—*M. B. McKay*.

2268. ROSSEM, C. VAN. De nauwkeurigheid van bemestingsproeven bij rijst, alsmede overzicht van de uitkomsten van de bemestingsproeven met stickstof- en fosforzuurhoudende kunstmest, genomen in de jaren 1911-1917. [The accuracy of fertilizer tests with rice, with a survey of the results of fertilizer tests with artificial fertilizers containing nitrogen and phosphoric acid.] *Dept. Landb. Nijv. en Handel [Nederland.-Indië] Alg. Proefsta. Landb. Mededeel.* 4. 33 p. 1920.—Errors due to soil variation are classed as systematic. If all observations are of equal accuracy, the arithmetic mean is the most probable value. Because the mean error decreases slowly with increasing numbers of observations, it is more economical to increase reliability by refining methods than by increasing the number of observations.

The mean error is a measure of the accuracy of a result, but not of its correctness. The latter depends also on the presence or absence of systematic errors. Deviations more than 3 times the mean error indicate systematic factors. Differences in experiments are considered significant if 3 times their mean error (4.5 times their probable error). In a test with 10 replications a difference must be as great as 6 pikols wet padi, and with 5 replications 8 pikols per bouw in order to be significant [1 pikol wet padi per bouw = 78 pounds per acre, or about 39 pounds milled rice per acre]. The mean error is independent of the mean yield. These conclusions are based upon 4 years' tests. In only 2 cases has potassium deficiency been demonstrated, and in these additions of potassium did not pay. The number of cases found of soils deficient in nitrogen equalled the number deficient in phosphorus, but the addition of double superphosphate to soils poor in phosphorus gave greater increases than the addition of equal quantities of ammonium sulphate or ammonium chloride to soils poor in nitrogen. In the district of Rembang an increased yield of 32 pikols per bouw resulted from adding 1 pikol of double phosphate per bouw.—*Carl Hartley.*

2269. RUZICKA, CHARLES H. Williston substation report 1914-1920. North Dakota Agric. Exp. Sta. Bull. 158. 104 p., 17 fig. 1922.—The results presented in many cases cover a period of 13 years. It is not evident that durum wheats have been significantly more resistant to drought and heat damage than the leading wheats of other groups.—In a rate-of-seeding test made with common wheat and extending over 8 years, yields from 4-, 5- to 6-peck rates were nearly identical.—A date-of-seeding trial was conducted with wheat for 4 years. Seeding was done April 15, May 1, and May 16. The average yields were 34.4, 29.7, and 20.2 bushels per acre, from early seeding to late seeding, respectively.—Phenological notes and weight per bushel are given on different groups of wheat.—Experiments do not warrant planting winter wheat except possibly in special cases.—Experiments were conducted with varieties of oats, barley, flax, and rye. In comparative yields secured from emmer, barley, and oats for a period of years, emmer has yielded 1728, barley 1875, and oats 2045 pounds per acre.—Both proso and millet occasionally have given excellent yields of seed.—Results with buckwheat have generally been negative.—In a 7-year trial of corn varieties, Dakota White Flint ranked 1st with 26.4 bushels, Gehu 2nd with 25.2 bushels, and North-western Dent 3rd with 23.2 bushels per acre.—The bulletin deals with manner, rate, and time of planting and cutting corn and previous treatment of the soil.—Following an ear-row and seed corn plot method for 5 years, yield was only slightly affected but the quality improvement was significant.—Certain varieties of sorgo gave good averages of fodder, but their inferior feed quality makes them an unimportant substitute for corn.—Sudan grass for an average of 6 years yielded 3351 pounds of air-cured hay per acre when sown in drills for cultivation.—Yields from sunflowers grown under dry land conditions were essentially the same as yields secured from corn similarly grown. In a trial of 1 season, sunflowers (irrigated) outyielded corn (irrigated) by 3 tons of green material per acre.—Forage crops from different kinds of millets have been successful only in certain years.—For the 3 years, 1915-1917, brome grass yielded 1528 pounds per acre and slender wheat grass 1253.—Timothy, red clover, and vetch have not been successful.—Results are discussed of extensive rotation experiments with small grains and corn.—Wheat on fall-plowed land plowed 8 inches deep and deep-tilled to a depth of 16-18 inches every 4th year showed only a slightly greater yield than when grown after plowing of medium depth.—It is possible to store in well handled fallow land only from $\frac{1}{3}$ to $\frac{1}{2}$ of the season's precipitation to be available for the succeeding crop. Disking stubble land in the fall after the binder has not shown increased yields over comparison plots treated in the ordinary way. Cultivation to maintain a mulch has evidently had but little effect aside from killing weeds.—Experiments with potatoes have covered a comparison of varieties, size and method of cutting seed tubers, rates and methods of planting, methods of soil treatment, and methods of field selection.—Notes are given on trees and shrubs and certain kinds are recommended. Notes are given on various fruits including crabapples, plums, and bush fruits.—*L. R. Waldron.*

2270. SCHUBERT. Eine bewährte Kartoffelsorte. [A potato variety of proved value.] Wiener Landw. Zeitg. 72: 96. 1922.—The variety Alma has been a consistent leader during 3 years of variety testing at several stations in Tyrol, outyielding in particular the newly introduced English potatoes.—*F. Weiss.*

2271. SCHUBERT, JOSEF S. **Etwas über Sortenwahl und Sortenwechsel im Kartoffelbau.** [Concerning selection of potato varieties.] *Oesterreich. Zeitschr. Kartoffelbau* 2: 1-3. 1922.—The author discusses the distribution of potato culture in Austria from the standpoint of soil types, yield, and varieties grown. He classifies varieties with respect to resistance to blight, scab, and wart diseases.—*F. Weiss.*

2272. SCHUSTER, GEORGE L. **Influence of fertilizers on yield and maturity of soy beans.** *Jour. Amer. Soc. Agron.* 14: 193-197. 1922.—It is the muriate of potash in fertilizers that brings the soy beans to maturity. Manure (3-5 tons per acre) favored early maturity—probably due to the potash contained—and gave the largest yields. In the absence of manure 250 pounds of acid phosphate and 75 of muriate of potash are recommended. Nitrate of soda gives unsatisfactory results with soy beans as to maturity, yield, and financial returns.—*F. M. Schertz.*

2273. SHERWIN, M. E., R. B. ETHERIDGE, AND A. DUNHAM. **A new muck soil problem and its solution.** *Jour. Amer. Soc., Agron.* 14: 212-215. 1922.—The authors discuss a muck soil problem in North Carolina.—*F. M. Schertz.*

2274. SNELLEN, E. **Over het groot-Rijstbedrijf in Ned-Indie.** [Large-scale rice culture in Dutch India.] *West Indië* 7: 71-79. 1922.—The fact that the region requires more rice than it produces has led to experiments with rice culture on a large scale as is done in California. In Surinam, fields were laid off to make possible irrigation and drainage. The experiments though not very successful are being continued. The author reviews an address by van der Veer before the Netherlands-India Association for Industry and Agriculture in the Hague, in which the speaker discussed the possible use of tractors, etc., in the rice fields. The difficulties and the special requirements of machines for successful operation are pointed out.—*A. J. Pieters.*

2275. SPARKS, G. C. **Some phases of wheat culture.** *Agric. Gaz. New South Wales* 33: 775-777. 1922.—A method of mass selection is suggested to be used on the farm. Care is urged to avoid seed injury when treating with formalin and copper sulphate.—*L. R. Waldron.*

2276. THOMAS, R. G. **Present and probable future distribution of wheat, sheep, and cattle in Australia.** *Proc. Roy. Soc. Victoria* 34: 117-127. *Fig. 1-3.* 1922.—The distribution is given by units of 5,000 acres of wheat, 10,000 head of sheep, and 1,000 head of cattle, based on the statistics of the year 1918-1919. Data on rainfall and temperature are also presented.—*Eloise Gerry.*

2277. WENHOLZ, H. **The conservation of fodder in New England.** *Agric. Gaz. New South Wales* 33: 783-789. 1922.—The crops and methods considered are those most profitable in averting stock losses due to drought in the winter season and in preventing a general unthrifty condition of stock. The fodder crops discussed are: cereal hay and straw, alfalfa, clover and sweet clover hay, maize stover, sorghum and Sudan grass hays, corn and sunflower silage, and oats and maize grain. Frequent comparisons are made with practices followed in the U. S. A.—*L. R. Waldron.*

2278. WERBA, KARL. **Versuche mit Phosphathumus.** [Experiments with "phosphathumus."] *Wiener Landw. Zeitg.* 72: 59. 1922.—Experiments with this "colloidal, phosphorus-containing, bacterial fertilizer" on potatoes and sugar beets are reported. Only a slightly larger yield was obtained by applying 15 kgm. of phosphathumus per 100 square m. and no increase with 10 kgm. The dry season of 1921 was unfavorable for the development of bacterial activity, which is claimed to result from the use of this fertilizer.—Phosphathumus was first produced to utilize the surplus of Thomas slag in the iron industry. It is said to contain 8-10 per cent of soluble phosphoric acid, 1 per cent each of potassium oxide and nitrogen, and 15-20 per cent of calcium oxide, besides 1-2 millions of active bacteria per gram capable of

ammonification and nitrification. The claim for the quantity and activity of the bacteria is doubted because of the conditions of manufacture and storage.—*F. Weiss.*

2279. WHITTET, J. N. Winter grasses in the Orange district. *Agric. Gaz. New South Wales* 33: 795-796. 1 fig. 1922.—A comparison of native with seeded pastures showed the decided superiority of the latter. Grasses showing most promise were *Avena elatior*, *Phalaris bulbosa*, and *Bromus inermis*, the last for winter pasture. One hundred milking cows pasturing 3 hours daily for 10 months in 16 acres of *Phalaris bulbosa* and *Dactylis glomerata* failed to keep the grass pastured down.—*L. R. Waldron.*

2280. WILLIAMS, C. G. The nitrogen inventory as affected by livestock vs. grain farming. *Jour. Amer. Soc. Agron.* 14: 159-162. 1922.—The author points out that apparently a moderate increase in the nitrogen content of the soil and a slightly larger yield of crops result from the live stock system than from the grain system.—*F. M. Schertz.*

2281. ZAILER, VIKTOR. Vergleichende Anbauversuche mit deutschen und schottischen Kartoffelsorten in Admont. [Comparative tests with German and Scotch potatoes in Admont.] *Oesterreich. Zeitschr. Kartoffelbau* 2: 17-19. 1922.—The German variety Jubel ranked 1st in every test on account of its resistance to disease, drought, and heat. The starch content and keeping quality of all potatoes was depressed owing to the short growing season. Varieties producing numerous small tubers had a higher starch content than those producing a few large ones.—*F. Weiss.*

2282. ZAVITZ, C. A. Grains grown in combination for grain production. *Jour. Amer. Soc. Agron.* 14: 225-228. 1922.—Barley, oats, wheat, and peas were grown separately and in combination. The greatest influence for high production was exerted by barley and the second highest by oats. If the proper varieties and proportions of barley and oats are grown together under favorable conditions a comparatively high yield of the mixed grain may be expected.—*F. M. Schertz.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 2340, 2525, 2783)

2283. ANONYMOUS. Subject index to periodicals, 1917-1919. Sec. K. Science and technology. *Roy. 4 to, 555 p.* Library Association: 53 Bloomsbury Square, London, 1922. 35 s. net.

2284. ANONYMOUS. The Royal Botanic Gardens, Kew. *Nature* 110: 423-425. 1 fig. 1922.—This is a brief description and history of the Gardens, with an aero-photo.—*O. A. Stevens.*

2285. ANONYMOUS. The year-book of the scientific and learned societies of Great Britain and Ireland. A record of the work done in science, literature, and art during the session 1921-22, by numerous societies and government institutions. Compiled from official sources. 39th annual issue, demy 8 vo, vii + 374 p. C. Griffin & Co., Ltd.: London, 1922.

2286. ANONYMOUS. Galton's centenary. [Rev. of: PEARSON, KARL. Francis Galton, 1822-1922: A centenary appreciation. (Department of Applied Statistics, University College, London. Questions of the Day and of the Fray, No. 11.) 23 p. Cambridge University Press: London, 1922.] *Nature* 110: 335-336. 1922.

2287. BRINKMANN, AUGUST. Die neue biologische Meeresstation des Museums zu Bergen. [The new station for marine biology of the Bergen Museum.] *Bergens Mus. Aarb. Naturv. Raekke* 1921/1922¹: 1-28. Fig. 1-14. 1922.—A description is given of the new station

for marine biology of the Bergen Museum. The old station in the town was abandoned as its water supply was rendered impossible by the new constructions of the Royal Navy, and a new and larger station was erected on the island Herdla, 15 nautical miles from the town. The buildings and apparatus as well as the research ship "Herman Friele" are described.—*K. Münster Ström.*

2288. FLETCHER, J. J. Presidential address. *Proc. Linn. Soc. New South Wales* 46: 1-13. 1921.—The author discusses the permanent establishing of the Australian National Research Council and the Commonwealth Institute of Science and Industry; the first Pan-Pacific Scientific Conference; the renewal of the regular meetings of the Australian Association for the Advancement of Science, and the local concerns of the Society.—*Eloise Gerry.*

2289. JONES, L. R. [H. H.] Whetzel resigns headship—deplores present system of administrative tenure. *Phytopathology* 12: 499-500. 1922.

2290. JORDAN, DAVID STARR. The days of a man, being memories of a naturalist, teacher and minor prophet of democracy. Vol. I. xxviii + 710 p., 56 pl. Vol. II. xxviii + 906 p., 56 pl. World Book Company: Yonkers-on-Hudson, New York, 1922.—This autobiography of a well known zoologist, educator, and statesman contains much information regarding botanists with whom he was associated, and the flora of places he visited, as well as his own early ventures in systematic botany and algology.—*C. W. Dodge.*

2291. L'ARGUS DE LA PRESSE, Editeur. Nomenclature des journaux et revues en langue française paraissant dans le monde entier. [List of journals and reviews in French appearing in the whole world.] 433 p. Paris, 1922.

2292. PASTEUR, LOUIS. Oeuvres de Pasteur reunies par Pasteur Vallery-Radot. [Pasteur's works collected by Pasteur Vallery-Radot.] Vol. I. viii + 480 p., portrait, fig. Vol. II. viii + 664 p., fig. Masson & Cie.: Paris, 1922.—This edition aims to reprint all the editions of each work of Pasteur, reprinting the whole work wherever it was extensively revised by the author, otherwise giving minor variants as foot notes. The 1st volume contains those papers dealing with stereoisomerism, the 2nd those with fermentation and spontaneous generation.—*C. W. Dodge.*

2293. SARGENT, C. S. The first fifty years of the Arnold Arboretum. *Jour. Arnold Arboretum* 3: 127-171. 1922.—The history of the Arnold Arboretum, which was founded in 1872, is related, its present condition and chief features described, and a systematic list of the genera of woody plants cultivated in the Arboretum given. This is followed by a long list of species and varieties introduced through the Arboretum into American gardens including a large number introduced for the first time into cultivation. An account is given of the herbarium, which now contains 200,000 specimens and a large number of fruits; of the library, which consists of 35,500 bound volumes and 8,000 pamphlets; and of the collection of 9,800 photographs. The work done by the Arboretum during the 50 years of its existence is described and its aims and future needs stated.—*Alfred Rehder.*

2294. SINGER, CHARLES. Early English magic and medicine. *Proc. British Acad.* 9: [1-34]. 1920.—This article outlines briefly the history of British medicine, including manuscript herbals and their illustrations.—*C. W. Dodge.*

2295. TAVARES, J. S. José de Ascensão Guimarães. *Broteria Sér. Bot.* 20: 130-146. *Portrait.* 1922.—The subject of this sketch was born at Faro, Portugal, in 1862, became a colonel of engineers, later retiring and entering business. His botanical works, noted in a bibliography of 6 titles, deal with Orchidaceae, Orobanchaceae, phyllotaxy, etc. He died at Lisbon in 1922.—*E. B. Chamberlain.*

2296. TUCKER, ETHELYN M. Bibliography notes. Jour. Arnold Arboretum 3: 227-231. 1922.—The author gives the dates of publication of the following works published originally in parts: Mouillefert, *Traité des Arbres & Arbrisseaux*; Voss, *Vilmorin's Blumengaertnerei*; Willmott, *The Genus Rosa*; also a correction referring to a former note on "Nouveau Duhamel" [see Bot. Absts. 9, Entry 669].—*Alfred Rehder*.

2297. VISSER, M. F. S. Lako. 1848-1922. *Cultura* 34: 353-354. 1 pl. 1922.—S. Lako was born in the province of Zeeland, Netherlands, studied chemistry and mechanics in Delft and agriculture in Proskau and Vienna. In 1905 the Dutch Government appointed him to take charge of the Institution for Agricultural Machineries in Wageningen. He died in Middelburg, November 1922, when 74 years old.—*J. C. Th. Uphof*.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 2257, 2284, 2285, 2286, 2290, 2294, 2398, 2701, 2717, 2719, 2720, 2721, 2722, 2885, 2890)

2298. ANONYMOUS. [Rev. of: DOWNING, E. R. *A naturalist in the Great Lakes region*. (The University of Chicago Nature Study Series.) xxv + 328 p. University of Chicago Press: Chicago, 1922.] *Nature* 110: 444. 1922.

2299. ABEL, R. *Bakteriologisches Taschenbuch: Die wichtigsten technischen Vorschriften zur bakteriologischen Laboratoriumsarbeit*. [Bacteriological pocket mammal; the most important technical directions for laboratory work in bacteriology.] 26 Auflage, bearbeitet von O. OLSEN. vi + 143 p. C. Kabitzsch: Leipzig, 1923.

2300. BEAR, FIRMAN E. The teaching of soils. Jour. Amer. Soc. Agron. 14: 307-312. 1922.—A general discussion of the subject is given.—*F. M. Schertz*.

2301. BLOMEFELD, L. *A naturalist's calendar kept at Swaffham Bulbeck, Cambridge-shire*. 2nd ed., edited by FRANCIS DARWIN. xviii + 84 p. University Press: Cambridge, 1922.

2302. ETHERIDGE, W. C., and M. L. FISHER. Report of the committee on lectures for a standard introductory course in field crops. Jour. Amer. Soc. Agron. 14: 128-136. 1922.

2303. FOREL, A. *Le monde social des fourmis*. Tome II. Sensations, physiologie, fourmis et plantes, hôtes, parasites, et nids. [The social world of the ant. Vol. II. Sensations, physiology, ants and plants, hosts, parasites, and ant-nests.] 8 vo, 184 p., 4 pl. Libr. Kundig: Geneva, 1922.

2304. GOLDSCHMIDT, RICHARD BENEDICT. *Ascaris; eine Einführung in die Wissenschaft vom Leben für Jedermann*. [Ascaris; an introduction to the science of life for everyone.] 296 p., illus. T. Thomas: Leipzig, 1922.

2305. HASKELL, S. B. A plea for experimental work in crops teaching. Jour. Amer. Soc. Agron. 14: 123-127. 1922.

2306. MILLER, M. F. Progress in standardizing the introductory courses in soils. Jour. Amer. Soc. Agron. 14: 217-222. 1922.

2307. RICH, S. G. A successful apparatus for demonstrating osmosis. School Sci. and Math. 22: 857-858. 1922.

2308. WELLS, A. B. Tests in biology and general science. School Sci. and Math. 22: 826-833. 1922.—The author gives copies of tests used, but no data regarding results.—*W. L. Eikenberry.*

CYTOLOGY

G. M. SMITH, *Editor*

(See in this issue Entries 2436, 2437, 2504, 2509, 2540, 2631, 2632, 2636, 2637, 2638, 2730, 2783)

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEO. D. FULLER, *Assistant Editor*

(See also in this issue Entries 2247, 2276, 2298, 2411, 2451, 2514, 2532, 2533, 2535, 2536, 2687, 2727, 2742, 2766, 2815, 2836, 2845, 2851, 2857, 2865, 2873, 2876, 2887)

FACTORS, MEASUREMENTS

2309. HORTON, ROBERT E. Results of evaporation observations. Monthly Weather Rev. 49: 553-566. 1921.—A tabular statement of evaporation at 28 localities for various periods between 1913 and 1920 is given. The stations are chiefly located in the semi-arid plateau section from Texas to the Canadian line.—*E. N. Munns.*

2310. PEARSALL, W. H. A suggestion as to factors influencing the distribution of free-floating vegetation. Jour. Ecol. 9: 241-253. 4 fig. 1922.—The examination of some 400 complete analyses and several thousand partial analyses of European surface waters as well as the consideration of other data brings out the fact that calcareous waters tend to produce greater quantities of plankton than the sea. Such waters seem to be better nutrient media on account of their larger proportions of nitrates, phosphates, and silica. The mass of plankton must be, according to this hypothesis, some function of the limiting ion (or ions). Thus the sea, with 3.5 per cent of dissolved solids, may be a decidedly limited medium for plant growth because of the small amounts of phosphates and nitrates.—*Geo. D. Fuller.*

2311. TOBLER, F. Die Wohlbecker Flechten-Standorte. [The lichen-habitats about Wohlbecker.] Hedwigia 63: 7-10. 1921.—The Zoological Garden of Wohlbecker is a peculiar habitat with respect to the presence of old oaks and beeches, which are rare in the surrounding area. Since 1885, when Lahm completed his extensive study and collecting of the lichens, many of the older trees have fallen, and the habitat has changed greatly. In 1914, Tobler noticed that the lichens were dying in considerable numbers, and he supposed that the light requirements might no longer be favorable for their growth on portions of the trunks within reach. But observation showed that the lichens did not flourish better higher up on the trees, the development ceasing rather abruptly at certain heights. He therefore decided to obtain data regarding possible effects of atmospheric moisture. Selecting an oak tree, he found that at 9 in the morning there was 4 per cent more moisture on the north side of the base of the tree than on the east or west sides. At the height of his head the difference was 3.5 per cent in favor of the north side over the west side and 2.5 per cent higher than on the east side. Another tree showed slightly greater difference at the height of his head, and the atmospheric moisture was, as a whole, about 10 per cent lower than about the 1st tree. Correlated with this difference in moisture he found that *Pertusaria amara* was growing but sparingly on the 1st tree at a height of about 0.5 m. above the ground and on the north side only, while on the 2nd tree this lichen grew from 0.5 to 2 m. from the ground on the north side and extended around somewhat to the east and west sides. He concluded that changes in atmospheric moisture, due to development of the forest and removal of undergrowth, working through the years since Lahm collected the lichens, had been the main deciding factor in the changes that have occurred in the lichen flora. Further, he found the temperature to be about 2°C. lower on the north side of the tree than on other sides, and this lower temperature would probably supplement the difference in atmospheric moisture.—*Bruce Fink.*

2312. TULLSON, H. **Prolonged plant activity at Grand Haven, Mich., in autumn of 1920.** *Monthly Weather Rev.* 49: 608-609. 1921.—Because of the mildness of the late fall and the occurrence of snow on the ground during periods of killing frosts and low temperatures, many plants blossomed profusely as late as Jan. 1, 1921, when with heavy frosts and ground free from snow all annuals which had been in a growing condition were killed.—*E. N. Munns.*

2313. VAN CLEEF, EUGENE. **Rainfall maps of Latin America.** *Monthly Weather Rev.* 49: 537-540. *Charts 150-152.* 1921.—The distribution of the annual, summer, and winter rainfall over South America is shown in a series of charts. The vegetation gives little clue as to the possible reasons for the rather semi-arid condition of the llanos of Colombia and Venezuela.—*E. N. Munns.*

STRUCTURE AND BEHAVIOR

2314. CHODAT, R., et L. CARISSO. **La vegetation du Paraguay. XI. Borriginacees. B. La myrmecophilie des Cordia de la section Gerascanthus.** *Bull. Soc. Bot. Genève* 12: 172-200. *Fig. 313-327.* 1920.—Certain species of "fire ants" are known to inhabit cavities in the stems of *Cordia*. No one formerly recognized these growths as true galls. By means of a series of stages of such growths from several species of *Cordia* it was possible to demonstrate the presence of ant larvae in all of the earliest stages and the growths resulting from the presence of the ants were typical galls.—*W. H. Emig.*

2315. CHRISTY, MILLER. **The flowering-times of some British elms.** *Jour. Bot.* 60: 36-41. 1922.—Notes on the flowering time of *Ulmus nitens* and *U. montana* were made for a period of several years. The date of the appearance of flowers of *U. nitens* varied from the beginning of January to the beginning of February but in exceptional years the flowers appeared as early as the end of December or as late as the end of March. There was considerable variation also in the numbers of flowers and, as a rule, the majority produced infertile seed. *U. montana* flowered with fair regularity from the middle to the end of March, rarely as late as the 1st week in April. Usually a large number of flowers appeared and the majority of them produced fertile seed.—*Adele Lewis Grant.*

2316. CLARK, J. EDMUND. **Flowering dates of trees along the main British railway routes.** *Nature* 109: 210-212. 1922.—Inquiry was made to establish an observation that in traveling from the west of England to London fruit trees are seen to be more precocious toward London. Phenological reports give no direct data since fruit trees and garden flowers were excluded from the list on account of the numerous varieties. Studies were made from data of black-thorn, garlic, hedge-mustard, horse chestnut, and hawthorn, 35 stations being available for 1920, but the season was abnormally early. It is concluded that London is at least a week earlier than Penzance. Further discussion is made of details and modifying influences. The Hopkins bioclimatic law appears to hold. Further confirmation was found in the study of a manuscript received from Prof. Hopkins. "The success obtained seems to imply that from absolutely trustworthy phenological records of seasonal changes for a single station in the northern hemisphere for one single plant, the whole seasonal phenology for any other plant or crop can be postulated for any other spot in North America, Europe, or Asia."—*O. A. Stevens.*

2317. DALLMAN, A. A. **The pollination of the primrose.** *Jour. Bot.* 59: 316-322, 337-345. 1921.—From systematic field observations carried on in North Wales and Sussex for a period of several years, the author concludes that certain Dipterous and Hymenopterous insects are active agents in the pollination of primroses. Snails and slugs and certain beetles assist during the night time but no moths were seen visiting the flowers. A number of hitherto unrecorded insect visitors to primroses are listed.—*Adele Lewis Grant.*

2318. LYON, C. J. **A phaenological study in New England.** *Torreyia* 22: 19-28. 1922.—The correlation between temperature and the time of first flowering was studied in the vicinity

of Hanover, New Hampshire, for the years 1917-1921 inclusive. A table showing the time of first flowering for 104 species is presented, indicating a wide range of variation definitely correlated with the temperature factor.—*J. C. Nelson.*

2319. PEMBERTON, C. C. Some notes of the growth of *Arbutus Menziesii* Pursh. Canadian Field Nat. 36: 21-26. Fig. 1-4. 1922.—On Vancouver Island there are large single trees of *Arbutus Menziesii* scattered on the plains, on margins of the forests, and on the sparsely wooded crests of hills and rocky elevations. Some trees give evidence of positive heliotropism. There was a continuity of flowering for 4 growing seasons. All stages from young buds to mature fruits occurred simultaneously.—*W. H. Emig.*

2320. PESSIN, LOUIS J. Epiphyllous plants of certain regions in Jamaica. Bull. Torrey Bot. Club 49: 1-14. Pl. 1, fig. 1. 1922.—A report is made of a study, in the field and laboratory, of epiphyllous plants in Jamaica. Possible modes of attaining the epiphyllous position are given as: continual growing forward and dying off below, of bryophytes, until they reach and cover the leaf; distribution, by rain and wind, of spores, etc.; and propagation of lichens and bryophytes by displaced fragments. Abundance of humidity, moderate temperature and calm atmosphere encourage epiphyllous growth. No penetration of the leaf by the epiphyll could be detected. Epiphyllous hepatics have specially adapted rhizoids. There is a possible relation between epiphyllous modes of life and parasitism.—*P. A. Munz.*

2321. PLITT, CHARLES C. A preliminary report, with notes, on the lichens found near the Cinchona Botanical Station, Jamaica, British West Indies. Bryologist 24: 60-64. 1921.—The author collected about 200 species of lichens near Cinchona in the summer of 1919. The actual enumeration of species is left for a subsequent article. The present paper outlines the physical and climatic conditions of the locality, and notes the habital and ecological relationships of the lichens found. For this purpose the species are roughly classified as fruticose, foliose, and crustose forms, only the first set being included in the present instalment.—Some tests of water absorption showed that air-dried material of *Cladonia aggregata* exposed to rain would take up 110 per cent of its weight of water, *C. pycnoclada*, 200, *Sticta aurata*, 300, and *Leptogonium bullatum*, 400 per cent. [See also following entry.]—*E. B. Chamberlain.*

2322. PLITT, CHARLES C. A preliminary report, with notes, on the lichens found near the Cinchona Botanical Station, Jamaica, British West Indies. Bryologist 24: 70-74. 1921.—This concluding part of the report deals with foliose, crustose, and epiphyllous lichens. It is, in the main, a running account of collections and ecological notes. The author concludes that *Sticta* and *Leptogonium* seem best able among the foliose lichens to endure shade, often extending horizontally outward and spirally around tree trunks to utilize the light. [See also preceding entry.]—*E. B. Chamberlain.*

2323. THOMPSON, H. STUART. The mild weather. Nature 106: 728. 1921.—*Hutchinsia petraea* was found in blossom Jan. 24 near Bristol. The usual period is from Mar. to Apr. The hazel was in full flower on Jan. 5.—*O. A. Stevens.*

VEGETATION

2324. ADAMSON, R. S. Studies of the vegetation of the English chalk, I. The woodlands of Ditcham Park, Hampshire. Jour. Ecol. 9: 113-219. 6 p., 13 fig. 1922.—This includes a detailed study of 4 types of woodland, namely, beech and oak-hazel forests and 2 sorts of coppice. The data concerning the habitats include mechanical and chemical analyses of the soils including H-ion determinations, light intensities measured by actinic paper, evaporation determinations by the Yapp atmometer, humidity, rainfall, and temperature data from meteorological records. Extensive plant lists give an analysis of the flora. On the chalk soils 2 types of forests dominated by *Fagus silvatica* are described. On west-facing slopes such woods have few shrubs and a sparse ground flora in which *Sanicula europaea* and *Epilobium angustifolium* are most abundant, the former in the deep shade and the latter where more light pene-

trates. On the north-facing slopes *Mercurialis perennis* forms much of the ground flora. On the plateau more grasses and mosses occur under the beeches. In the "calicicolous coppice" *Cornus* and *Fraxinus* are most abundant while in a "transition coppice" *Corylus*, *Fraxinus*, and *Betula* are dominant. These coppices are related to the different types of beech forest.—An oak-hazel forest is developed on some of the deeper leached soils. *Quercus robur* is here the chief tree but *Betula alba* and *Fraxinus excelsior* are usually present in considerable numbers. The chief shrub is *Corylus avellana* with *Cornus sanguinea* and *Euonymus europaeus* rather abundant. The undergrowth shows several variations but *Mercurialis perennis* is generally abundant.—*Geo. D. Fuller.*

2325. CHODAT, R., et G. BEAUVERD. Herborisation du 17 juin aux Buxaies de la Sarraz (Vaud). Bull. Soc. Bot. Genève 12: 142-148. 1920.—The spring flora near Sarraz is divided into a number of ecological groups.—*W. H. Emig.*

2326. DICE, L. R. Biotic areas and ecologic habitats as units for the statements of animal and plant distribution. Science 55: 335-338. 1922.

2327. HANDEL-MAZZETTI, HEINR. Übersicht über die wichtigsten Vegetationsstufen und -formationen von Yünnan und SW.-Setschuan. [Survey of the principal vegetation zones and formations of Yunnan and southwest Szechuan.] Bot. Jahrb. 56: 578-597. 1921.—This is an elaboration of a paper first published in 1916 [Sitzungsber. Akad. Wiss. Wien (Math.-Naturwiss. Kl.) July 1916, Nov. 1917, and Jan. 1920] and is based on the vertical distribution of about 400 indicator plants. The author discusses his conclusions in comparison with those of Wilson. Because of complications due to the deep narrow valleys in the mountains it was necessary to treat this area separately from the Yunnan tableland. The subject matter is treated under the following headings: A. Tropical province. (1) Tropical rainforest: (2) tropical savanna; (3) jungle; (4) sclerophyllous bush; (5) subtropical savanna forest; (6) water plants. *Musa sapientum* and *Carica papaya* are characteristic cultivated plants.—B. Region of Yunnan tableland. (1) Subtropical zone (about 1800 m.), dry in summer, temperature 18-30°C. in summer; (a) subtropical savanna forest, (a¹) lower part with succulents, *Citrus*, and *Saccharum*, divided into southern zone and northern zone, (a²) upper part, without succulents; (b) grass steppes; (c) ravine forest; (d) rock desert; (e) sand steppes. (2) Warm temperature zone, 1800-2900 m., of which 9 associations are recognized and described.—C. Region of high mountains of North Yunnan and southwest Szechuan including 6 zones as follows: subtropical, warm temperate, temperate, cold temperate, high mountains, and snow zones, with extensive subdivisions under each.—D. Northeast Birma- and West Yunnan high mountains, divided also according to climate into subtropical, warm temperate, temperate, cold temperate, high mountains, and snow regions with extensive subdivisions.—*K. M. Wiegand.*

2328. HASTINGS, G. T. Succession of algae in the Grassy Sprain reservoir. Jour. New York Bot. Gard. 22: 64-66. 1921.—In this artificial reservoir near New York City there is a succession of algae throughout the season. The green algae reach their maximum in late May and early June, and the blue-greens in September.—*H. A. Gleason.*

2329. HOWE, MARSHALL A. The "working" of Long Lake. Jour. New York Bot. Gard. 22: 156-159. 1921.—The "working" of this lake at the New York Botanical Garden was caused by the prolific development of *Oscillatoria prolifica* (Grev.) Gomont.—*H. A. Gleason.*

2330. KENOYER, L. A. Forest formations and successions of the Sat Tal Valley, Kumaon Himalayas. Jour. Indian Bot. 2: 236-258. 6 pl., 3 fig. 1921.—Sat Tal Valley lies just north of the outermost range of the Himalayas, at 29° 23' N. Lat., 79° 32' E. Long. Altitudes vary from 4160 to 5860 feet. At this elevation the 3 great forest formations of the lower Himalayas—monsoon deciduous, broad leaf sclerophyll, and *Pinus longifolia*—meet. Frost may occur down to 4000 feet. The annual rainfall is 85 inches, of which 84 per cent falls during June—

Sept. The monsoon deciduous forest, ranging from 2500 to 5500 feet, is dominated by *Bauhinia variegata*, *B. retusa*, and the giant liana *B. VahlII*; other common trees are *Terminalia* spp., and *Grewia asiatica*. This forest reaches its upper limit in the Sat Tal Valley, where it is confined to southerly exposures. It is determined by a periodic precipitation, and a temperature that seldom falls below freezing. Most of the trees are deciduous; leaf fall with some species begins in the winter, and during March–May most of the species are bare. A large number flower at this time. Leaf fall appears to be due to moisture deficiency; but it is surprising that most of the deciduous species put out new leaves before the monsoon has begun. Commonly the new leaves do not appear till the fruits are mature; young trees and staminate trees were observed to leaf out much sooner than fruit-bearing trees. The broad leaf sclerophyll formation in the Himalayas falls into 3 altitudinal zones, each dominated by a distinct species of *Quercus*. Only the lowest of these zones, extending from the monsoon deciduous forest to 8000 feet, and dominated by *Q. incana*, occurs at Sat Tal. With this oak are *Rhododendron arboreum* and *Pieris ovalifolia*. This forest reaches its lower limits in the Sat Tal Valley, and is confined to cooler, shadier northerly exposures, and to moist depressions. It requires a winter temperature falling somewhat below freezing, and greater humidity than the monsoon deciduous forest. None of the dominant trees are ever quite leafless. The *Pinus longifolia* forest contains no other important species; it attains greatest development between 4000 and 6500 feet, and is always confined to dry exposed ridges and hilltops. In the Sat Tal Valley the monsoon deciduous forest occupies the warmer south-facing slopes and valleys, the *Quercus incana* forest the cooler north-facing slopes and valleys, while the *Pinus longifolia* is found on the dry ridges between them. The author attempts to work out both hydrarch and xerarch successions, though the valley has been protected from grazing, cutting, and fire for only a few years. He concludes that “the pine and the *Bauhinia* seem to be xerarch pioneers” in this area, “and the oak is the climax toward which the former two tend.” Seasonal periodicity is a marked feature of the vegetation. During the monsoon, June–Sept., the herbaceous vegetation shows decided tropical affinities, while in the autumn and spring the under-vegetation is more like that of temperate regions. Lianas and parasites are rather abundant. Epiphytic lichens, mosses, and ferns are abundant in the oak forest, and orchids are common in the monsoon deciduous forest. A list is appended of about 75 tree and 65 shrub species observed by the author.—*Winfield Dudgeon*.

2331. MALTA, N. Ökologische und floristische Studien über Granitblockmoose in Lettland. [Ecologic and floristic studies of the mosses on granite erratics in Livonia.] *Latvijas Augstskolas Raksti* (Acta Universitatis Latviensis) 1: 108–124. 1921.—Floristically, granitic erratics in the lowlands are interesting from the presence of montane species far below the usual levels; ecologically, the erratics, through restricted area and constant character of the substratum, permit easy determination of the effect of varying conditions of atmosphere and insolation, and facilitate the study of the impact of different plant associations. The thinnest layers of soil over a granitic erratic change the moss flora profoundly, often with sharp contrasts between top and sides of the block, while a limestone block will make its influence felt through the accumulated material. Hence a granite block may show rapid change in its flora in the course of years, at times becoming wholly submerged by inroads of surrounding associations. This submergence is conditioned by the size of the block, presence of moisture, insolation, slope of the sides, and the relative vigor of surrounding associations. Per contra, large blocks in sunny places show great fixity in their moss flora even over long periods, though the surrounding terrain is undergoing constant change through cultivation, if only mechanical injury from men or animals is absent. The changes in moisture, as through drainage of swamps, seem to produce the most rapid changes in flora.—The colonization of new plants on bare blocks seems dependent upon the relief of the surface and hence upon the petrologic composition. Smooth surfaces seem first occupied by lichens between which mosses later appear; rough surfaces support a large flora in the minute hollows, as many as 27 plants (13 species) to the square m. being noted.—Four moss associations may be recognized, 3 conditioned by sunlight (the *Grimmia*-association of full sunlight, the shady-thicket-association, the woodland-association), and 1 (the hydrophyte-association) by water content. Lists of species

characteristic of each association are given, and a general list of 15 hepatics and 96 mosses considered as true granite dwellers. A bibliography of 10 titles follows.—*E. B. Chamberlain.*

2332. O'DONOGHUE, CHAS. H. A preliminary survey of the biota of a sand spit in Lake Winnipeg. *Canadian Field Nat.* 35: 121-131. 1921.—This sketch of the life conditions on a sand spit of Berens Island includes a list of plants arranged according to zones and frequency.—*W. H. Emig.*

2333. PEASE, A. S. Gray pine and arbor vitae. *Rhodora* 23: 247-249. 1921.—Observations were made from the car window upon the growth of *Pinus Banksiana* and *Thuja occidentalis* along the line of the Algoma Central and Hudson Bay Railroad from Salt Ste. Marie, Ontario, northward for nearly 300 miles, and extended eastward along the line of the National Transcontinental Railway toward Quebec. In general, the 2 species were not seen in the same regions and where their ranges overlapped there was evidence of a decided difference in their habitats, to this extent corroborating the conclusions of Fernald in respect to these 2 species [see *Bot. Absts.* 4, Entry 283.].—*James P. Poole.*

2334. POISSON, H. La flore septentrionale de Madagascar et la flore malgache. [The northern flora of Madagascar and the Madagascan flora.] *Rev. Gen. Bot.* 33: 577-588, 694-707, 758-770. 1921.—The flora is influenced by 3 factors—soil, climate, and man. Of the 3, man has caused most change. Three regions are considered from a geological and geographical point of view,—the central part, and the western, and eastern coasts of Madagascar.—The Madagascan flora is becoming uniform due to the extension of the savannas; it will return to regional characteristics very slowly because the soil will be recovered by cultivated plants. From the point of view of the botanist this loss of rare and curious species is to be regretted, but the development of agriculture is for the greater good of Madagascar. It would be better to cut the brush than to burn it for then in the places inaccessible for cultivation many interesting forms would be found among the remaining species.—The flora is divided into 4 groups based on the types of soil on which they grow. These groups are: (1) the limestone flora, presenting a majority of xerophytes; (2) the sand and sandstone flora; (3) the savanna flora, chiefly Gramineae; and (4) the tropical forest flora. Lists of the plants found in these localities are given.—*J. C. Gilman.*

2335. PONCY, R. Contribution a la biologie des tourbieres Genevoises. [Contributions to the biology of the Swiss bogs.] *Bull. Soc. Bot. Genève* 12: 150. 1920.—This paper includes observations of *Iris pseudacorus* L. and *Nymphaea alba* of the Swiss bogs.—*W. H. Emig.*

2336. UPHOF, J. C. TH. Ecological relations of plants in southeastern Missouri. *Amer. Jour. Bot.* 9: 1-17. 2 pl., 3 fig. 1922.—The author describes the geology, topography, and climate of this region. There are 2 main ecological areas, the Ozark Hills and the bottom lands along the rivers. He describes the plant associations and lists the important species of the dry barren hills and of the richer lower slopes in the Ozarks, and of the ponds, swamps, and forests of the bottom lands.—*E. W. Sinnott.*

2337. WILSON, E. H. Notes from Australasia. II. The New Zealand forests. *Jour. Arnold Arboretum* 2: 232-236. 1921 [1922].—New Zealand, before its settlement by white men, was for the most part densely clothed with a mixed rain forest in which old types of taxads and conifers were the dominant trees; of these the most valuable timber trees are *Dacrydium cupressinum* Sol., 4 species of *Podocarpus*, and *Agathis australis* Steud., the Kauri, the tallest of the New Zealand trees, attaining a height of 150 feet. These trees have the roots clothed with tubercles analogous to those of leguminous plants which contain nitrogen-fixing bacteria. This explains the slow and poor regeneration of these trees on the deforested areas where the soil has become unfit for their growth, on account of the destruction of the bacteria by exposure and fire. Ruthless destruction during the last century has reduced the forested area greatly,

and as the regeneration of the taxads and conifers is difficult in the dense forest because of the shade, and on the deforested areas for the reason stated above, the broadleaf dicotyledonous trees, which are of less commercial importance, will supersede these older types.—*Alfred Rehder.*

FLORISTIC PLANT GEOGRAPHY

2338. BEWS, J. W. The south-east African flora: its origin, migrations and evolutionary tendencies. *Ann. Botany* 36: 209-224. 1922.—The flora of Southeast Africa is composed of 2 distinct elements, a tropical-subtropical one and a temperate one. The tropical flora has invaded the region along the coast-belt, where it remains distinctly tropical. Toward the south the tropical species are gradually replaced by allied subtropical forms. Migration has also occurred toward the interior from the coast-belt along the river valleys which run at right angles to the coast. In this direction also the flora soon becomes subtropical in association with the higher altitude, lower temperature, and drier conditions. When allied tropical and subtropical forms are compared in respect to floral morphology it is generally found that the former are more primitive. It is concluded that the subtropical forms are derived from the tropical element in adaptation to the changed conditions. The temperate element has migrated along the great mountain ranges which run parallel to the eastern coast across the tropics and connect with the southwestern Cape region. When allied tropical and temperate forms are compared in regard to floral morphology, it is found that in many families the tropical element is the older while in others the temperate representatives have retained more of the primitive floral characters. Particular examples are given of tropical genera (e.g., *Rhus*) which have produced species that have invaded temperate regions and also of temperate genera (e.g., *Pelargonium*) which have invaded the tropics.—*W. P. Thompson.*

2339. HARPER, ROLAND M. Cape Cod vegetation. *Torreyia* 21: 91-98. 2 fig. 1921.—A bibliography of the various papers dealing with the flora of the Cape is presented. None of these describes the vegetation in detail. In surface features and plant topography the Cape resembles Long Island. Though formerly destitute of trees, there is now considerable forest. The author spent 3 days in October, 1920, studying the vegetation. Lists are presented of the plants observed, including 16 trees, 4 woody vines, 16 shrubs, 4 undershrubs, and 20 herbs. Ten of the entire list are thought to be introduced. *Pinus rigida* is the most abundant tree. Nearly all of these plants grow also on Long Island. Many species common in the interior of New England are absent.—*J. C. Nelson.*

2340. NELSON, EDWARD W. Lower California and its natural resources. *Mem. Nat. Acad. Sci. [U. S. A.]* 16: 1-194. 1921.—In this treatment of the Peninsula of Lower California the following sections are of especial botanical interest: Plant Life, p. 103-110; Life Zones, p. 121-132; Natural Resources in Animal and Plant Life, p. 132-136; Scientific Explorations, p. 140-147; Bibliography of Lower California, p. 147-171. The author considers that the vegetation of the Peninsula has been derived from 3 sources. The northwestern portion, consisting chiefly of the San Pedro Martir Mountains, bears a flora that is identical with that of the mountains of southern California. The southern third shows a strong infusion of species from the arid tropical lowlands and low mountains of Sinaloa. The remaining two thirds shows a close connection with desert regions of southwestern U. S. A. and northwestern Mexico. The flora of the Peninsula is characterized as being one of the most remarkable desert floras in the world.—*Rozana Stinchfield Ferris.*

2341. PALMER, ERNEST J. The forest flora of the Ozark region. *Jour. Arnold Arboretum* 2: 216-232. 1921 [1922].—The author gives a brief account of the topography, geology, and climate of the Ozark region bounded on the east and north by the valleys of the Mississippi and Missouri rivers, on the south by the Gulf Coastal Plain, and on the west by the Great Plains. It is one of the oldest land areas of the continent and consists chiefly of older palaeozoic sedimentaries. The annual rainfall through almost the entire Ozark region averages between 35 and 40 inches. The composition of the forest flora and its different formations are de-

scribed and it is stated that about 90 per cent of the woody plants belong to the Gulf Coastal Plain flora. Numerous colonies of northeastern woody plants together with many herbaceous species are found on the northern and eastern slopes of bluffs and steep hillsides. It is stated that the movement of the southern flora toward the north is of comparatively recent inception and still in active progress, the less hardy species gradually disappearing toward the north; the forest is encroaching upon the prairies of the northwestern portion and upon the treeless hills characteristic for some sections of the western part of the region and is driving back the remnants of the flora of the western plains which still exist in these parts.—*Alfred Rehder.*

2342. WILLIAMS, M. Y. **Biological notes along fourteen hundred miles of the Mackenzie River system.** Canadian Field Nat. 36: 61-66. 1922.—Besides observations on the fauna of the region, there is a short list of flowering plants and a few notes on the ecological associations.—*W. H. Emig.*

APPLIED ECOLOGY

2343. ANONYMOUS. **Searching the world for new food plants.** Sci. Amer. Monthly 3: 516-518. 6 fig. 1921.—A brief account is presented of the expedition of H. L. SHANTZ and REVAL through darkest Africa in quest of new fruits, nut plants, and forage crops.—*Chas. H. Otis.*

2344. DIEHL, G. B. **Relation between the rainfall, temperature and the yield of corn in Argentina.** Monthly Weather Rev. 49: 543-548. Fig. 1-6. 1921. [Translation of: HESSLING, N. A. *Relaciones entre la lluvia, la temperatura y el rendimiento del maiz.* Bol. Mens. Oficina Meteorol. Nacion. Oct., 1918.]—The relation between yields and climate for corn has been found to be the precipitation during the Oct.-Jan. period with temperature a minor factor. In the calculations, the coefficient of correlation was used.—*E. N. Munns.*

2345. SLADEN, F. W. L. **Fireweed as a honey-plant.** Agric. Jour. [British Columbia] 6: 122. 1921.—The status of this plant as a honey producer is discussed with some reference to local conditions.—*J. W. Eastham.*

2346. WEST, FRANK L., and N. E. EDLEFSEN. **The climate of Utah.** Utah Agric. Exp. Sta. Bull. 166. 66 p., 18 fig. 1919.—This is a summary of the climatic conditions of Utah, based upon a careful study of weather data taken at the leading town of each county in the state. The amount and distribution of rainfall and the length of the growing season are shown in graphic form for each county.—*B. L. Richards.*

MISCELLANEOUS

2347. HOFER-HEIMHALT, H. **Die Geologie der Torfmoore.** [The geology of peat-moors.] Naturwissenschaften 9: 260-265, 280-285. 1921.

2348. SUMNER, F. B. **The organism and its environment.** Sci. Monthly 14: 223-233. 1922.—It is held that morphologists, physiologists, taxonomists, geneticists, etc., all too often ignore or inadequately consider the environment when investigating an organism in part or as a whole.—*L. Pace.*

2349. TAYLOR, NORMAN. **Flora of Mt. Marcy.** Ann. Rept. Amer. Scenic and Hist. Preservation Soc. 25: 317-318. 1920.

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 2229, 2269, 2324, 2330, 2510, 2689)

2350. ANONYMOUS. **Annual return of statistics relating to forest administration in British India for the year 1919-20.** 25 p. Simla, 1921.—Summaries are presented for British

India forest work, and among the important subjects discussed are working plans, forest offenses, fire protection, grazing, planting, forest utilization, forest income, and forest area.—*S. B. Show.*

2351. ANONYMOUS. *Les lignes électriques à travers les forêts.* (Conférence de M. W. von ARX, inspecteur des forêts de la ville de Soleure, à la réunion de la Société Forestière Suisse à Aarau, le 29 août 1921.) [*The electrical lines across the forests.*] Jour. Forest. Suisse 73: 6-10. 1922.—It is proposed to check by proper legislation the unscrupulous expansion of transmission systems by electro-technic interests, which are ignoring entirely forestry and esthetic considerations. It is desirable to eliminate shortcomings of existing laws, which differentiate between public and private utilities companies.—*G. Kempff.*

2352. ANONYMOUS. *Progress report of forest research work in India for the forest year 1919-20, including the administration report of the Forest Research Institute, Dehra Dun.* 56 p. Allahabad, 1920.—This is the 1st general summary of the research work of the Indian Forest Service, and covers all phases of the work, both that done at and under the direction of the Central Institute at Dehra Dun and the work in the various provinces. One chapter each is devoted to silviculture and working plans, forest botany, forest economy, forest zoology, forest chemistry, as the major subdivisions of research work, and 1 each to a general survey of the situation and to forest publications. A total of 294 permanent sample plots are now under observation by the Central Institute, in addition to others carried by the provincial offices. The experiments in regeneration are largely devoted to study of sal. Experimental work in regeneration of the evergreen forests of Eastern Assam have been initiated. In Burma extensive work with teak regeneration has been undertaken. In Madras regeneration of the deciduous semi-evergreen forests is being studied. The diseases of sal dominate as the principal studies under forest botany. Studies in forest economy are being started extensively. Pulp and paper, antiseptic treatment, seasoning, mechanical properties, by-products, veneers, cooperage, new uses and technical qualities are all being studied. Insects affecting sal and teak especially are studied. The gums, resins, camphor, turpentine and tannins from oaks are also being investigated.—This publication is designed primarily to give workers in India a complete picture of the experiments under way, but will be welcomed by those in other countries who have heretofore been obliged to look through numerous special provincial reports to secure the information here brought under one cover.—*S. B. Show.*

2353. ANONYMOUS. *The progress of state afforestation.* [Rev. of: ANONYMOUS. *Second report of the forestry commissioners: Year ending Sept. 30, 1921.* H. M. Stationery Office: London, 1922.] Nature 110: 369-370. 1922.—On account of reduced appropriations a leasing policy was pursued. The commission secured over 68,000 acres of which nearly 8,000 were planted. Small grants to land owners secured the planting of 11,000 acres on private estates. Afforestation provides work for the unemployed. Material assistance was received from the Unemployment Fund. Four schools for apprentice woodmen were established, and experimental work is in progress on 79 sample plots.—*O. A. Stevens.*

2354. ANONYMOUS. *Forest policy and forest management.* [Rev. of: (1) SCHLICH, W. *Schlich's manual of forestry.* Vol. I. *Forest policy in the British Empire.* 4th ed., rev. and enlarged, xi + 342 p. Bradbury, Agnew and Co.: London, 1922. (2) HAWLEY, R. C. *The practice of silviculture; with particular reference to its application in the United States.* xi + 352 p. J. Wiley and Sons: New York; Chapman and Hall: London, 1921. (3) CHAPMAN, H. H. *Forest mensuration.* xxii + 553 p. J. Wiley and Sons: New York; Chapman and Hall: London, 1921 [see also Bot. Absts. 12, Entry 398]. (4) JACKSON, H. *A short manual of forest management.* x + 70 p. University Press: Cambridge, 1921.] Nature 110: 407-409. 1922.

2355. AFZAL, MUHAMMED. *Progress report of forest administration in Baluchistan for 1919-20.* iii + 25 p. Calcutta, 1921.—Chil (*Pinus longifolia*) seedlings which were watered during the summer have done well, while those untended have died. In general the problem

is to protect and develop the forests of this province, which is much behind most of the other provinces of India. The usual detailed tabulations of area, offenses, fires, output, receipts, expenditures, etc., are given.—*S. B. Show.*

2356. AFZAL, MUHAMMED. Progress report of forest administration in Baluchistan for 1920-21. *iii* + 24 p. Calcutta, 1922.—The usual detailed tabulations of area, offenses, output, receipts, expenditures, etc., are given. The forests of the Zhob district are administered by the political agent and are reported on separately.—*S. B. Show.*

2357. ALTSON, A. M. Beetles damaging seasoned timber: With an account of their ravages and the method of treatment. *Roy.* 8 vo, 24 p. Wm. Rider & Sons: London, 1922. 2s. 6d. net.

2358. BADOUX, H. Quelques observations sur les dégât causés récemment par la pyrale grise du mélèze. [Some observations of recent devastations by the gray larch caterpillar.] *Jour. Forest. Suisse* 73: 1-6. 1 pl. 1922.—The gray larch caterpillar (*Steganoptycha pini-colana*) defoliates larch stands (*Larix europaea*) by devouring the needles. Its life cycle and habits are briefly described. All the damage is caused during the larval stage, in 23-28 days during May and June, and consists essentially of a loss of growth. The infestations occur at regular intervals of about 9 years, each invasion lasting 2-3 years. The danger of infestation to larch stands may be lessened by appropriate preventive measures, such as thinnings, mixed stands, etc.; but all repressive measures tried have proved unsuccessful.—Observations made during the summer of 1921 show extensive infestations and depredations not only in larch but also in Cembran and mountain pine. The attack occurred exclusively upon the current annual shoots, principally the leader, resulting in a considerable loss of growth.—*G. Kempff.*

2359. BARBEY, A. La Nonne dans les Alpes valaisannes. [The gypsy moth in the Valaisian Alps.] *Jour. Forest. Suisse* 73: 21-25. 1 pl. 1922.—The author describes the first known moth invasion of the Swiss forests, which occurred during the dry summer of 1921. An unidentified moth attacked a stand 1 hectare in size, located in the communal forest of Ernen just above the junction of the Binna and the Rhone rivers and composed of 90 per cent *Præa excelsa* and 10 per cent *Pinus sylvestris* 60-80 years old. The observations on the habits of the insects and the resultant damage are reviewed, as well as the possible cause of the invasion. The utilization of all infested material and the complete burning of all the bark are the chief repressive measures put into effect.—*G. Kempff.*

2360. BENNETT, H. C. Progress report of forest administration in Coorg for 1920-21, with a review by the chief commissioner and orders by the government of India. 2 + 16 + 14 p. Bangalore, 1922.—As for the other divisions of India, the report for this year covers only a 9-month's period in order that the forest and fiscal years may be made to coincide. Among the important subjects discussed are reforestation, reproduction methods, eradication of lantana from sandal-bearing areas, care of plantation and teak taungyas, forest fires, protection, diseases, felling operations, forest products, market conditions, revenues, and expenditures. Research on the spike disease of sandal continued, though with inconclusive results, and a wide variety of other silvicultural problems are also being studied intensively. Protection-burning of grass hills was done with help from villages and with satisfactory results, no accidental fires being reported. The customary detailed tabulations of various phases of the department's work are included in the report.—*S. B. Show.*

2361. BILLSON, H. G. Annual progress report of forest administration in the United Provinces for the forest year 1919-20. 34 + lxxxv + 5 p. Allahabad, 1920.—Forest area, working plans, road and trail construction, utilization operations, grazing, reforestation, timber sales, and forest incomes are among the important subjects considered. A summary of the report prepared by the Secretary to Government is included.—*S. B. Show.*

2362. BILLSON, H. G. *Annual progress report of forest administration in the United Provinces for the period July 1, 1920 to Mar. 31, 1921.* 28 + lxxiii + 3 p. Allahabad, 1921.—This is a detailed report of the activities of the Forest Department, but is for 9 months only, so that the forest year may be made to coincide with the fiscal year. It considers fully the subjects of forest area, road and trail construction, forest improvements, offenses, grazing, reforestation methods, felling operations, and forest income. Insect inquiry to sal continues serious. Poor and good natural reproduction are reported respectively for sal and chir pine forests. Resin output doubled in the year. A summary of the report by the Secretary to Government is included.—*S. B. Show.*

2363. BLASCHECK, A. D. *Progress report on forest administration in the Punjab for the year 1919-20.* 16 + lxxiii y., map. Lahore, 1920.—The report considers forest area, boundary surveys, working plans, forest offenses, fire protection, improvement and thinning work, cutting operations, forest income, and research. Late frosts damaged irrigated plantations.—*S. B. Show.*

2364. BLUNT, A. W. *Progress report of forest administration in the Province of Assam for the year 1919-20.* iii + 30 + 49 p. Shillong, 1920.—This annual report covers all phases of the work of the department, including statistics on area, boundary surveys, output, receipts, expenditures, offenses, fires, grazing, etc. Progress was made in reserving village forests, which is an urgent problem. In the reserved forests only 933 square miles were open to grazing whereas all unclassed forests were open. The eradication of climbers from sal forests is in arrears, though 2,300 acres were treated; burning was resorted to in order to rid the ground of evergreens. Natural reproduction of sal and teak was poor, but was good in the evergreen forests of the east. Experiments in natural regeneration of the evergreen forests, which are to be clear cut, promise success. No tapping was done on the Ficus plantations because of the lack of a market. Extending the taungya plantations of sal met with only moderate success. Improvement fellings in the sal forests of the west covered 9,338 acres; in the evergreen forests of the east, clear felling is to be practiced. A fair amount of research work on sal and the regeneration of the eastern evergreen forests is under way. A general summary of the important features of the report of the Secretary to Government is a valuable feature of the report.—*S. B. Show.*

2365. BRUBAKER, H. W. *A study of the oil from sumac (Rhus glabra).* Trans. Kansas Acad. Sci. 30: 221-222. 1919/21 [1922].—The chemical properties of the oil from berries of *Rhus glabra* are compared with those of other vegetable oils such as cotton seed and corn oil. A use may be found for it as an edible oil, in soap making, or as a semi-drying oil in the paint industry.—*F. C. Gates.*

2366. BUB-BODMAR, F., und B. TILGER. *Die Konservierung des Holzes in Theorie und Praxis: Ein Handbuch.* [Handbook on the theory and practice of wood preservation.] 8 vo, xx + 1006 p. P. Parey: Berlin, 1922.

2367. CARY, N. LEROY. *Sitka spruce; its uses, growth, and management.* U. S. Dept. Agric. Bull. 1060. 36 p., 20 pl. 1922.—This bulletin is a survey of the Sitka spruce industry on the Pacific coast from Alaska to northern California. The geographical and altitudinal distribution is given, with estimates of the amounts available. The character of the wood, its uses, and methods of logging and milling are described, together with the reproduction, growth and management.—*J. Lincoln Cartledge.*

2368. COULON, P. DE. *Jardinage cultural ou méthode du contrôle.* [Practical or mathematical application of the single tree method.] [Rev. of: BLOLEY, H. E. *L'aménagement des forêts par la méthode expérimentale et spécialement la méthode du contrôle.* (Forest management by the experimental method, especially the method of control.) 91 p. Attinger Frères: Paris, 1920.] Jour. Forest. Suisse 73: 25-29. 1922.—Biolley champions the mathe-

matical fixation of the cut in the working plan and its rigid application in the field. DeCoulon maintains that this is not feasible and should be omitted.—*G. Kempff.*

2369. COVENTRY, B. O. **Progress report of forest administration in the Jammu and Kashmir states for the year 1919-20.** (Sambat 1976.) 25 + lxiii p. Lahore, 1922.—This is an annual report on the work of the Forest Department. The area of state forests increased from 9639 to 9714 square miles. Among the important subjects discussed are boundary surveys, working plans, road construction, offenses, fires, reforestation, felling operations, rafting, forest products, forest income, and forest expenditures. Natural regeneration, especially in deodar forests, is good. Elimination of the destructive grazing by goats through gradual increase in fee is now under way. A force of 200 of the military was employed to suppress the smuggling of kuth out of the state. The Srinagar fuel supply continues to be a problem, with planting of willow on swamp land as the only solution. As in other states of India, plans are under way for increasing the staff. The usual detailed tabulations covering all phases of forest work are included in the report.—*S. B. Show.*

2370. COX, S. **Annual administration report of the forest department of the Madras Presidency (India) for the year ending June 30, 1919.** 87 + lxi + 11 p. Madras, 1920.—This annual report covers in detail all forest operations. The control of the Department was transferred from the Board of Revenue to the newly appointed Chief Conservator. The area of reserved forest decreased from 18,837 to 18,712 square miles, while reserved lands rose from 668 to 682 square miles. Forest working plans, offenses, fire losses, protection, grazing research, forest utilization, and forest income are considered. Bamboo and sandal-wood were extensively exploited. The Madras Forest College has continued satisfactorily. A separate report is given for each of the 4 circles in the Presidency, with a general summary, a statement of progress in each line of work for the 5-year period, and detailed statements of receipts, expenditures, fire protection, grazing, etc., for the different circles and subdivisions thereof.—*S. B. Show.*

2371. COX, S. **Annual administration report of the forest department of the Madras Presidency (India) for the three-fourths year ending March 31, 1921.** 83 + lxi + 11 p. Madras, 1921.—Since this report, covering in detail all forest operations, is for $\frac{3}{4}$ of the fiscal, instead of forest, year, the comparison with figures for previous years is impossible. It considers the subjects of forest area, boundary surveys, working plans, road construction, protection, offenses, grazing, utilization, and forest income. Protection burning was inaugurated. The possibilities of bamboo as a source of paper pulp are discussed. Important progress in the artificial regeneration of teak is noted. In the review of the report by the Government, the need for education of the people in the aims of the forest administration is emphasized. The forest college continued to work well. A separate report for each of the circles is given with a general summary for the entire Presidency, a review by the Government, and detailed statements of receipts, expenditures, fire protection, grazing, changes in area, etc., for the different circles and subdivisions thereof.—*S. B. Show.*

2372. CROTHERS, E. M. **Progress report of forest administration in Coorg for 1919-1920, with a review by the Chief Commissioner and orders by the Government of India.** 2 + 13 + 14 p. Bangalore, 1921.—This is an annual report on all phases of forest administration. The area of reserved forests remained constant at 332,500 acres. Among the important subjects discussed are forest improvements, fire protection, grazing, planting, felling operations, forest income, and expenditures. Studies on the relation of lantana to sandal disease were continued as well as efforts to eradicate the pest on plantation and regeneration areas. Sowing of teak and cultural operations on previous plantations were continued. Considerable research work covering a wide range of subjects is being done: sample plots for growth and yield studies, attempts to produce artificially the "spike" disease of sandal, studies on soil aeration, natural reproduction, thinnings in teak, sowing and planting are all represented. The usual detailed tabulations covering areas, progress in various phases of the work, output, receipts, etc., are included.—*S. B. Show.*

2373. DONS, CARL. Litt om store traer i Nord-Norge. [A little about big trees in northern Norway.] *Naturen* 46: 220-236. *Fig. 1-12*. 1922.

2374. GERRY, ELOISE. Oleoresin production: A microscopic study of the effects produced on the woody tissues of southern pines by different methods of turpentine. U. S. Dept. Agric. Bull. 1064. 46 p., 7 pl. 1922.—Results clearly demonstrate that those methods of turpentine which conserve the vitality of the tree insure the greatest production of oleoresin. "Turpentine is not merely a draining out of the gum already formed; it is a collection of the oleoresin constantly being manufactured by the tree." Production is greatly increased due to wounding. Cupping in place of boxing eliminates unnecessary injury to the tree and the proper spacing and placing of the faces on the tree are matters of fundamental importance. It is unprofitable to turpentine trees less than 10 inches in diameter by present commercial methods. Turpentine does not effect the wood already formed, except the living parenchyma in the outer sapwood, the resin passages which contribute much of the yield. Structure of the wood produced after wounding is considerably modified especially above the face, where many more resin passages are formed. This is greatest about 1 foot above the wound and still slight at 6-9 feet above. Although the increase in resin passages is an important factor in securing a high yield, they are not the only, or perhaps not even the chief, source of the turpentine. Differences in chipping methods effect structure of the wood and production. Heavy chipping is much more injurious to the tree and gives lower sustained yield than conservative narrow chipping. The former results in delay in wood formation, in formation of resiniferous tissue, in a reduction in the width of annual rings, and in thickness and amount of walls of the summer wood, while conservative narrow chipping largely overcomes these disadvantages. Wood formation, especially the width of the growth rings and the amount of summer wood produced by uninterrupted trees of the same locality, was taken as the standard for estimating the effects of the different chipping methods. Many miscellaneous observations and suggestions of further problems are added.—*J. T. Buchholz*.

2375. GRIEVE, J. W. A. Progress report on forest administration in the Punjab for the year 1920-21. 19 + *lviii* p., *map*. Lahore, 1921.—The report covers only a 9-month's period, since, as in other provinces, the forest year and fiscal year are being made to coincide. The area controlled by the Department was reduced from 6744 to 6626 square miles chiefly by devoting lands to colonization. This is only 7 per cent of the total area of the Punjab. Among the important subjects discussed are working plans, labor problems, transportation facilities (including ropeways), forest offenses, fires, reforestation, forest products, seasoning, forest income, and forest expenditures. Experiments in raising conifers in combination with field crops have been started. Much resin continues to be collected and progress is reported in making an acceptable standard product. The Punjab Government has authorized adequate financing for developing forest resources, both by government loans and cooperative profit-sharing plans. The administration has been reorganized by creation of Chief Conservator and Utilization Conservator positions. The drought has affected the work of the Department by making labor more plentiful than before. The usual detailed statements of areas, receipts, etc., are a part of the report, and an abstract of the entire report, prepared by the Revenue Secretary to the Government, is a valuable feature.—*S. B. Show*.

2376. GRIST, D. H. Kapok. *Malayan Agric. Jour.* 10: 51-55. 1922.—*Eriodendron anfractuosum*, the source of the fiber Kapok, is not very common in the Malay Peninsula. In the Straits Settlements the number of trees seems to be only about 10,000. It has a great enemy in the white ant, which in the drier soil destroys it and is a limiting factor to its natural distribution. The tree fruits as young as 4 years. The life of the tree may be 50 years. The seed contains over 20 per cent of oil.—*I. H. Burkill*.

2377. HENRY, AUGUSTINE. The western larch in cultivation. *Quart. Jour. Forest.* 16: 161-174. 1922.—Western larch has not proved a successful introduction to Great Britain on account of the insular climate. It is susceptible to canker and in seedbeds yields, as a rule,

only a small proportion of vigorous seedlings. It is very intolerant of shade, narrow of crown, and unable to smother the grass which springs up in plantations. In its native habitat the larch differs remarkably from other species in the rapid ripening of cones, which shed their seed completely in September. The production of cones in most years is small, good crops being rare. Germination tests indicate a variation in the quality of the seed from 5 to 65 per cent. Seed steeped for 3 weeks gave excellent germination. As the cones ripen the heaviest seed fall out first so that collectors arriving after the cones start to open gather a larger proportion of small seed than the trees actually produce. Plantations in Great Britain show 5-10 per cent good trees, 10-15 per cent small trees, and 75-85 per cent of useless weaklings. The paucity of good trees in a plantation is the worst fault of *Larix occidentalis*. In Idaho the seed requires considerable moisture and heat up to 90°F. for successful germination. Under storage it retains its vitality well, having germinated 20 per cent at the end of 5 years. The tree has succeeded best in Great Britain on good deep soil and has thrived well of ground from which timber was just previously removed. It fails on stiff clay soils and on ground covered with dense matted grasses, rushes, etc. It does poorly on shallow soil over chalk. Slight evidence exists that the climate of eastern Great Britain is more congenial to the species than that of the western districts. In western Montana the larch grows closer together and has a more slender stem than European larch in Britain. Its volume and height is less in youth, but exceeds in height after 50 years and in volume after 70 years the European species. Larch was first introduced into Europe in 1881. The oldest trees are 42-47 feet high (apparently at age of 42-45 years). Only 1 has a straight stem; the others have curved stems, indicating sensitiveness to winds. Plantations and individual specimens of various ages on many sites do not in general give much promise or compare favorably with European and Japanese larch.—C. R. Tillotson.

2378. HULLAH, J. **Quinquennial report of forest administration in British India for the period 1914-15 to 1918-19 to which is appended the annual return of forest statistics for the year 1918-19.** 11-28. Simla. 1920.—This is a general summary of the work of the forest departments of British India for the 5-year period of the great war. Forest acreage, surveying, engineering, fire protection, grazing, planting, felling operations, income, forest entomology, and personnel are among the important subjects discussed. Planting progress in taungya plantations was made. Great progress in studies of regeneration of sal and deodar is reported. Graphic representation of some of the more important facts in the report is a valuable feature.—S. B. Show.

2379. JACOB, W. R. LEG. **Report on forest administration in the Andamans for the year 1919-20.** iii + 41 p. Calcutta, 1921.—Cutting of climbers in young stands was done on 2680 acres. The plantations, chiefly of teak and mahogany, have been tended; the area is now 4299 acres. The report includes the usual detailed tabulations showing areas, railway construction, output, receipts, expenditures, etc. In striking contrast to the other Indian provinces there were no forest fires and no unlawful fellings. A general abstract, such as is included in most Indian reports of similar nature, is not given.—S. B. Show.

2380. KAUTZ. **Die Verjüngung und Pflege der Buchen- und Fichtenhochwaldbestände im Schmalschlagbetriebe in der Oberförsterei Sieber (Harz).** [The regeneration and care of beech and Norway spruce highforest stands in small cutting operations in the Sieber forest range (Hartz Mountains).] Zeitschr. Forst.- u. Jagdw. 53: 348-406. Fig. 1-13. 1921.—The author discusses intensively past experience in regenerating beech and the present practice of securing beech regeneration under the small shelterwood-strip system; the care of pure beech stands by carefully conducted cleanings and thinnings, which retain the vigor of healthy reproduction; the proper conducting of thinnings in pole stands (40-80 years old); the regeneration and care of pure Norway spruce high-forest stands, also of mixed stands of beech and spruce; protection against destructive agents; and the relation of the small area operation to the continuous management systems, which include all systems which at no time leave the forest floor unstocked. The small area cutting system as compared with extensive

area and clear-cut systems strives mainly to secure better protection of the forest soil and reproduction against such dangers which are caused by logging and removal of the timber from forests.—*J. Roesser, Jr.*

2381. KOEHLER, ARTHUR. The identification of true mahogany, certain so-called mahoganies, and some common substitutes. U. S. Dept. Agric. Bull. 1050. 18 p., 13 fig. 1922.—A key is given for the identification of the woods of true mahoganies (*Swietenia* spp.), "African mahogany" (*Khaya* spp.), "Philippine mahogany" (*Shorea* spp.), and others, as well as *Betula lenta*, *B. lutea*, and *Liquidambar styraciflua*, the common substitutes. The woods, trade and common names, and sources of the various species are described, and a glossary of terms is given. The figures are photographs of the grain of various woods, magnified 7.5 diameters.—*J. Lincoln Cartledge.*

2382. LEE of FAREHAM, and G. G. LEVENSON GOWER. The ninety-eighth report of the commissioners of H. M. Woods, forests and land revenues, for the year ending March 31, 1920. 57 p., H. M. Stationery Office: London, 1920.—The total income for the year was £ 1,156,790, of which £ 128,187 was from timber, the balance from agricultural and house properties, mines, interest, etc. The expenditures were £ 477,859 of which £ 108,421 was for planting, cultural operations, etc. In accordance with various acts of Parliament, expenditures, incomes, leases, rents, etc., are given in great detail.—*S. B. Shaw.*

2383. LENT. Forstdüngungsversuche im Regierungsbezirk Sigmaringen. [Experiments in forest fertilizing in the government district Sigmaringen.] Mitteil. Deutsch. Landw. Ges. 37: 663-666. 1922.—This work was started in 1905, when the first plantings were made. Eleven treatments were tried including checks, all duplicated except 1 check plot and 1 plot to which 2000 pounds of calcium were applied. The tests included the turning under of 1 crop of alsike clover, the application of lime, phosphates, potash, and ammonia. To determine the effect of the treatments, the height of the trees (spruce) and the length of the terminal growth were measured every year from 1906 to 1920. Further height measurement was rendered impossible by the height of the trees; in 1922, the diameters at breast height were measured for every 3rd row. The results all pointed to the great value of phosphate fertilizers, but a comparison of growth in different years brought out the fact that growth was influenced by temperature and moisture more than by fertilizers.—*A. J. Pieters.*

2384. MATTOON, WILBUR R. Longleaf pine. U. S. Dept. Agric. Bull. 1061. 50 p., 22 pl. 1922.—A comprehensive discussion is presented of *Pinus palustris*, its range and importance, its second growth, rate of growth on various lands and under fire protection, and production of timber for cross-ties, cord-wood, and saw-timber. Various methods of turpentinizing and its effect on growth are described. Methods of reforestation, sowing and planting, protection against fire, hogs, insects, diseases, and other injuries are considered.—*J. T. Buchholz.*

2385. MAXWELL, HERBERT. Defoliation of oaks. Nature 110: 344. 1922.—The British oak (*Quercus robur* L.) has 2 distinct races, regarded by some botanists as distinct species (*Q. pedunculata* Ehrh. and *Q. sessiliflora* Salisb.). The latter, known as durmast oak, is the commonest indigenous form in western and northwestern Great Britain. It rarely ripens fruit, hence is less common in plantations, but is distinctly less susceptible to damage by *Tortrix*. The timber of the 2 forms is of equal quality.—*O. A. Stevens.*

2386. MILLISCHER, . Sur l'enrésinement. [Concerning the conversion of hardwood into coniferous forest.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 320-332. 1922.—A discussion is given of the transformation of hardwood coppice into coniferous high forest of fir. The retention of a mixture of beech, ash, and maple with the fir is desirable to the extent of 10-50 per cent depending on the needs of the community for firewood. The conversion should increase the owner's revenue 10 fold, and should be made wherever there is

a deep soil, north exposure, humid climate, with regular and abundant precipitation, and elevation from 500 to 1,000 m. The natural method is to take advantage of seedlings from neighboring seed trees which should be disengaged of the coppice at intervals of 10 or 15 years. The other method is by planting the fir after making a reproduction cutting in the hardwoods. Fir can be introduced by sowing or by planting, the latter in the autumn. Disengagement cuttings repeated every 5 or 10 years are indispensable to the success of the fir.—*J. Kittredge, Jr.*

2387. MILWARD, H. G. **Annual progress report of forest administration in the United Provinces for the forest year 1918-19.** 8 + 38 + cxvii + 7 p. Allahabad. 1919.—This annual report covers in detail the various phases of the forest work. It considers the forest area, income, utilization, reforestation offenses, fire protection, grazing, and forest income. Insect damage to sal, and to chir pine following fire, is noted. A brief review of the 5-year period 1914-15 to 1918-19 shows as outstanding features the increase in area of reserved forest from 5,410 to 7473 square miles, the great investment in utilization improvement projects, the increase of forest offenses from 2997 to 4421, increase in output of timber and fuel from 20,105,000 to 26,355,000 cubic feet, the great increase in income, already noted, and the excellent success in afforestation of denuded areas on over 3000 acres. A review by the Secretary to Government is a valuable feature of the report.—*S. B. Show.*

2388. MONNIN. **Sur la qualification des bois.** [Concerning the qualifications of woods for different uses.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 347-357. Fig. 1-11. 1922.—Descriptions and illustrations are given of the wood structure of European fir, American spruce, white pine, mahogany, red birch, black walnut, ash, and oak. Methods of determining the coefficient of elasticity, the modulus of rupture, and resistance to shock are given. A table compares the characteristics of fir, spruce, and larch woods (all from the same station in the Alps) as to appearance, shrinkage, moisture content, specific gravity, compression, bending, resistance to shock, and transverse shearing.—*J. Kittredge, Jr.*

2389. OSMASTON, B. B. **Report on the forest administration of the Central Provinces (India) for the year 1919-20.** I. The report. 7 + 32 p. II. Statistical statements. lxiii p. Nagpur, 1921.—The annual summary of the work of the Forest Department shows there was no change of consequence in the constitution of State forests, which cover $\frac{1}{3}$ of the area of the province. Among the important subjects considered are boundary surveys, forest offenses, working plans, road construction, forest fires, planting, grazing, forest utilization, and forest income. Taungya plantations total 7946 acres. Collection and revenues from lac are discussed. Revised scales of pay for subordinates were put into effect. The personnel, especially in the higher grades, is felt to be inadequate. Part II of the report summarizes in detail the various phases of the work of the Department. A summary by the Revenue Secretary precedes the Conservator's report.—*S. B. Show.*

2390. PAERELS, J. J. **Cocoa-cultuur op Java.** [Coca growing in Java.] *Cultura* 34: 328-330. 1922.—*Erythroxylon coca*, the Peru coca, and *E. novagranatense*, the Java coca, are considered. The latter grows from sea level to an elevation of 1000 m. and more. A moist climate is beneficial for leaf production. The seed lose their germinating capacity within 2-3 weeks. Seed treatment and nursery practices are discussed. Coca is also grown as a secondary crop, especially between coffee and *Hevea*. The first harvest of leaves takes place when the trees are pruned to a height of 1 foot. When plants are 3-3 $\frac{1}{2}$ feet high they are cut back to a height of 2-2 $\frac{1}{2}$ feet.—When leaves are harvested they are spread out to prevent fermentation. The more quickly the leaves are dried or the lower the temperature, the less the alkaloid is decomposed. When picked in early morning, they should be dried the same day. Leaves are also dried artificially. After drying they are pulverized and packed. In Java 600-750 kgm. per bouw (=0.70 hectare) are produced. Most of the crop is sent to Amsterdam (265,000-910,000 kgm. yearly). Some is sent to the U. S. A.—*J. C. Th. Uphof.*

2391. PARNELL, R. **Progress report on forest administration in the Northwest Frontier Province for the year 1919-20.** 2 + 2 + 15 + xxviii p. Peshawar Cantonment, 1920.—The

area of reserved forests has remained constant at 159,925 acres, and protected forests at 77,519 acres. Forest working plans, forest offenses, protection, reforestation, improvement cuttings, felling operations, forest products, forest income, and forest expenditures are among the important subjects discussed. Deodar appears to compete unsuccessfully with blue pine, the regeneration of which, as well as of chil pine, is excellent.—The question of reorganization of the Forest Department is still unsettled. The customary detailed tabulations covering all phases of the work of the Department are included in the report, and reviews by the Revenue Secretary and the Inspector-General of Forests are valuable features.—*S. B. Show.*

2392. RECORD, SAMUEL J. **Notes on woods.** Science 55: 266-269. 1922.—West Indian boxwood may refer to wood from (1) *Aspidosperma Vargasi* DC., the first on the market, now largely replaced by (2) *Casearia praecox* Griseb.; and (3) *Phyllostylon brasiliensis* Capanema (= *P. rhamnoides* Taubert = *Samaroceltis rhamnoides* Poisson), the wood of which is of inferior quality. It is often stated incorrectly that West Indian boxwood comes from *Tabebuia (Tecoma) pentaphylla* B. & H. f. Brazilian tulipwood is supplied by *Physocalymma scaberrimum* Pohl. Coffeewood for umbrella handles comes from Venezuela and the best evidence points to *Caesalpinia Ebano* Karst. as its source. "Rosewood" covers several different woods, so named from color or scent. Surinam rosewood, or "rozenhout," the source of an essential oil, is established as *Aniba* sp. (near *A. panurensis* Mez.). True Brazilian rosewood is *Dalbergia nigra* Fr. All. and trade varieties are based on color variations only. Honduras "rosewood," the best for xylophone bars, has not been identified beyond being one of the Leguminosae, possibly a *Dalbergia*. Cocobolo, used for knife handles, comes from several countries. In Panama it is from *Dalbergia retusa* Hemsley, in Nicaragua from *D. hypoleuca* Pittier in ed., while the wood from Mexico is probably from a new species. "Redwood" of Panama is *Platymiscium dubium* Pittier; of Brazil it is *Brosimum paraense* Huber. The latter promises to be much like, if not identical with, "satiné" of French Guiana which has been named *Ferolia guianensis*. Kakatara-balli, a dull-white wood of British Guiana, seems to be from some species of *Ilex*.—*C. J. Lyon.*

2393. TRAFFORD, F. **Annual progress report on forest administration in the province of Bihar and Orissa for the year 1918-19 with a summary of progress during five years 1914-15 to 1918-19.** 69 + 5 p. Patna, 1919.—This report considers forest area, offenses, protection, grazing, planting, timber sales, and forest income. Teak and casuarina plantations were increased somewhat, and taungya plantations are promising. A good seed year is reported for sal though regeneration was retarded by evergreen undergrowth. The summary for the 5-year period ending with the year under report shows considerable progress in reorganization of the department; the personnel is inadequate, otherwise the record is one of fairly steady progress, with the financial results particularly striking. A review of the report by the Secretary to Government and a map of the province are valuable features of the report.—*S. B. Show.*

2394. TRAFFORD, F. **Progress report of the forest administration in the Province of Assam for the year 1920-21.** 15 + 49 + 2 p. Shillong, 1921.—Since the forest year is being made to coincide with the fiscal year, this report covers a 9-month period in the work of the forest department. A good seed crop of sal and other important species is reported. Experiments in natural regeneration of sal by a combination of fire and grazing were inconclusive, but similar studies in the evergreen forests of the east promise success. Taungya plantations of sal were made on a minor scale. An area of 13,084 acres of sal forests was worked under improvement fellings. The report considers gross and net yields of different operations, areas, construction work, offenses, fires, fire protection, personnel, expenditures, etc. A valuable summary of the more important features of the year's work, prepared by the Revenue Secretary to Government, is given. M. A. W. Blunt, one of the veterans in the service, and formerly conservator of the western circle, has retired from active service.—*S. B. Show.*

2395. TREBELJAHR. *Die taxatorische Behandlung von Mischbeständen.* [Management of mixed stands.] *Zeitschr. Forst- u. Jagdw.* 63: 616-626. 1921.—In this reply to Denzin's article [see Bot. Absts. 11, Entry 2354], Trebeljahr contends that the division of mixed stands into distinct working sections by species is theoretical, impracticable, and complicates the plan. In mixed stands the division into regular working sections should be based on the age classes and rotation period of the principal tree; and all species should fall into one working section. Continuity of management is dependent upon such age class division. The new arrangement does not entail more bookkeeping. The management plan is not a statistical work, which Denzin claims as an advantage of the former system.—*J. Roeser, Jr.*

2396. TREBELJAHR. *Kieferndauerwaldwirtschaft.* [Continuous forest management in pine.] *Zeitschr. Forst- u. Jagdw.* 53: 286-294. 1921.—This article constitutes another chapter in the dispute between Möller and Trebeljahr in which the latter replies to Möller's article [see Bot. Absts. 11, Entry 2394]. Trebeljahr is opposed to the continuous management system in pine as practiced at Bärenthoren for he regards it as impractical when applied in extensive state forest operations. Leaving the litter on the soil undoubtedly raises the site quality, but Trebeljahr contends that this is not a characteristic of the continuous management system. Since the author is a soil-rental theorist he does not support Möller's authorities, such as Fricke, von Hagen and Borggreves; he analyses the latter's formula and shows that it is untenable since it does not consider intermediate yields.—*J. Roeser, Jr.*

2397. U. *Die Zukunft der Jugoslawischen Wälder.* [The future of Yugoslavian forests.] *Wien. Allg. Forst u. Jagd Zeitg.* 40: 141-142. 1922.—The author covers the legal rather than silvicultural aspects and criticizes certain governmental forest regulations and presents systems of taxation as fostering short-sighted policies.—*F. S. Baker.*

2398. WEBER, HEINRICH. *Grundlinien einer neuen Forstwirtschaftsphilosophie.* [Foundations of a new philosophy of forestry.] 116 p. Tübingen, 1919.—Part I deals with laying the foundations of forestry science. In this the author attempts to analyze and answer 3 questions: What is science in general? What is the object of forestry science? What is forestry science? Part II deals with the system of forestry science, both in its immediate and in its historical development. Part III deals with the methodology of forestry science (research methods), both in its present status and in its historical development. Weber's system of forestry science is built upon human consciousness itself. The end products of thought, volition, and feeling, which constitute consciousness, are respectively the natural (both mathematical and biological) sciences, the volitional or sociological sciences, and the sciences underlying the arts. Each works with its own methods; by means of logic, ethics, and aesthetics respectively. These 3 together with psychology may be said to constitute the main body of philosophical thought. The natural sciences include mathematics, physics, chemistry, botany, zoology, meteorology, climatology, geology, etc.; the volitional sciences include political science, sociological science, and economics; the so-called art sciences are included in the term "forest aesthetics." Forestry science presents 3 main aspects—the fundamental aspect, meaning the fundamental sciences, the norm of forest production, and lastly forest practice. The norm is built upon the fundamental sciences, and upon the norm is built forestry practice. The latter, reciprocally, has a controlling effect upon the norm. The norm is considered the keystone of the entire philosophical structure.—*Richard H. D. Boerker.*

2399. WITT, D. O. *Annual progress report on forest administration in the Province of Bihar and Orissa for the year 1919-20.* 59 + 3 p. Patna, 1920.—Details of the work of the forest department are covered. The report discusses forest area, offenses, fire protection, working plans, land acquisition, cooperative work, and forest income. A review by the Secretary to Government is a valuable feature of the report.—*S. B. Show.*

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 2229, 2239, 2253, 2262, 2286, 2480, 2482, 2486, 2492, 2501, 2505, 2507, 2514, 2515, 2547, 2561, 2626, 2665, 2845, 2848, 2857, 2861)

2400. ANONYMOUS. Hybrid *Nymphaeas*. Missouri Bot. Gard. Bull. 10: 127-131. Pl. 18-20. 1922.—Water lilies have been cultivated since 3000 B. C. Schweinfurth studied specimens from funeral wreaths of Rameses II in comparison with the white nocturnal (night-blooming) *N. Lotus*. It is concluded that species have not noticeably changed in 4000 years. All tropical diurnal (day-blooming) water lilies are colored, excepting *N. gracilis* from Mexico. The African species *N. ovalifolia* has white petals tipped with blue and pink. White is not recessive in crosses. *N. ovalifolia* in crosses segregates its type in F_2 . *N. gracilis* in crosses does not segregate that type.—The cross *N. ovalifolia* \times *N. "Mrs. Edwards Whitaker"* and the reciprocal cross were made. The cross with *N. ovalifolia* as seed parent produced both albinos and "Whitaker." Selection fixed the dominant albino character in 3 years' self pollination. Self pollinated "Whitaker" yielded a light campanula-blue type also produced as a hybrid from *N. castaliiflora* \times *N. castaliiflora*. Another hybrid of uncertain parentage is described. Trade designations are used in the discussion.—J. Ben Hill.

2401. ANONYMOUS. Nocturnal hybrid water-lilies of the late James Gurney. Missouri Bot. Gard. Bull. 10: 147-150. Pl. 24-26. 1922.—Seven nocturnal (night-blooming) hybrid water-lilies, the result of work of the late James Gurney, are described. Parentage is uncertain in all cases, 2 species, *Nymphaea Lotus* and *N. rubra*, comprising the original stock. Selections were made of promising hybrid seedlings. One hybrid derived from parents of the lotus type was both nocturnal and diurnal (day-blooming) indicating the possibility of obtaining diurnal segregates from nocturnal types.—J. Ben Hill.

2402. ANONYMOUS. The present position of Darwinism. Nature 110: 751-753. 1922.—In this summary of the discussion at the joint meeting of the botany and zoology sections of the British Association for the Advancement of Science, natural selection is attacked by J. C. WILLIS from the geographical distribution point of view and by UDNY YULE from the results of statistical analysis. It is contended that no proof exists for the mechanisms Darwin assumed to account for natural selection; also that the hypothesis of "age and area" and "size and space" offer a better explanation of geographical distribution and evolution than does natural selection. Distribution is regarded as a question of dispersal and time acting at a uniform rate. Willis regards large mutations of greatest importance in evolution.—Yule discusses statistically the theory of "age, size, and space." Genera "throw" species whose numbers increase in geometrical ratio with time. J. STANLEY GARDINER approves the thesis of "age and area." C. TATE REGAN criticizes the statistical work of Yule and Willis claiming Darwin's work had stood the test. CHALMERS MITCHELL considers that Willis has presented merely a caricature of natural selection. H. WAGER dismisses fluctuating variations as of no evolutionary value but says mutations need not be large. He directs attention to an alternate title for "origin of species," namely, "preservation of favored races."—A. C. SEWARD criticizes "age and area" theory pointing out that conifers and ferns in restricted areas are the oldest forms. E. B. POULTON states that in African butterflies the younger form has a greater distribution than its ancestral type. A. B. RENDLE considers multiplication of forms in geometrical progression unlikely in limited space. He regards as difficult the differentiation between useful and useless characters. R. RUGGLES GATES emphasizes the importance of extinction of forms as an evolutionary factor. JULIAN HUXLEY states that in the Gipsy moth apparently useless characters are correlated with physiological differences harmonizing with environment.—W. JOHANNSSEN thinks that most geneticists are agnostics as to the mechanism of evolution. W. J. DAKIN believes the faculty of evolution is a character of organisms as are irritability and reproduction. J. Stanley Gardiner agrees that evolution is an inherent property of protoplasm.—J. Ben Hill.

2403. ANONYMOUS. **Testing of new varieties of the potato for immunity from wart disease.** Scottish Jour. Agric. 5: 306-311. 1922.—Samples of potatoes to be tested were first sprouted in boxes, and tubers with sprouts differing in color from the bulk of the sample were discarded. Observations were made to determine trueness to variety and to detect the occurrence of diseases other than wart, notably blight, corky scab, mosaic, and leaf-roll. Samples of new varieties of potatoes are tested for at least 2 seasons, and if they satisfactorily pass the trials a certificate for immunity to wart is granted. Of the 80 American varieties under test, 18 named sorts and 3 seedlings were immune, and 3 additional seedlings were doubtfully immune. The immune varieties comprise 10 types as follows: Irish Cobbler (4), Early Harvest, Ehnola, Perfect Peachblow, Early Manistee, Green Mountain (6), Netted Gem, Keeper, Northern King, M'Cormick. Of 22 varieties from Germany, 4 proved to be immune. A synopsis of the American Report on British Varieties Sent to the United States in 1920 is given as well as a brief note on the German Report on British Varieties.—*J. A. Faris.*

2404. ANONYMOUS. **Wart disease of potato immunity trials.** Gard. Chron. 72: 229. 1922.—Additional facts regarding immunity trials at the testing station of the Scottish Board of Agriculture are given [see preceding entry]. Tests are made with single tubers and also with 6 tubers of each kind. In the single tuber tests numbers of pedigree seedlings of both immune and non-immune varieties were included to obtain knowledge of the probable percentage of immune types which might be expected in either case. Selfed immune varieties produced a large number of immune seedlings. Crossing a non-immune with an immune variety (President \times Flourball) showed about 40 per cent of immune individuals after 2-years' test, but crossing 2 immunes (Majestic \times Flourball) gave a percentage of 70-80 of immunes.—*J. A. Faris.*

2405. AUCHTER, E. C. **Apple pollen and pollination studies in Maryland.** Proc. Amer. Soc. Hort. Sci. 18: 51-80. 1921 [1922].—Sterility tests made in 1919 and 1920 of 66 varieties of apples showed that 45 were self-sterile, 12 self-fertile, and 9 partially self-fertile.—In 1919 approximately 1000 blossoms (in 1920, 500) of each variety, in the pink stage, were inclosed in manila sacks. Sacks were removed after flowering was over and a record made of fruits; this record was repeated after the "June drop." In all cases 1000 unbagged blossoms were counted to serve as a check and to indicate the "normal set." Removing bags and brushing the stigmas did not increase set of fruit in 4 self-fertile varieties, nor did it cause setting of fruit in self-sterile varieties. Bagging is, apparently, a safe method of testing self-sterility even though stigmas are not brushed. To insure cross-pollination, varieties should bloom at approximately the same time. Except for very early and very late blooming varieties there is sufficient overlapping of periods to permit cross-pollination. Blooming records for 107 varieties covering 1-8 years show that dates of bloom and length of periods vary in different years and are influenced by many factors; the average for a number of years is a safe index. Intersterility studies indicate that Stayman Winesap \times Winesap and Stayman Winesap \times Arkansas, as well as the reciprocals, are intersterile. Winesap and Arkansas are apparently intersterile. A test of Early Ripe, Red June, Red Astrachan, Oldenburg, and Bloomfield showed in general that early varieties are cross-fertile, although pollen of Oldenburg and Bloomfield used in Early Ripe failed.—Pollen from 19 varieties was used on Lawver; 15 varieties failed and 4 gave success, the percentages, ranging from 0.6 to 5.37, suggesting that cross-sterility may be more serious than supposed.—Slightly higher pollen germination percentages were secured in 10 than in 2, 5, and 15 per cent sugar solutions. Pollen of most varieties germinated equally well whether listed as self-fertile or as self-sterile. Stayman Winesap and Arkansas pollen gave practically no germination.—The set of fruit increased from nearly 2 to 5-fold when pollen from larger buds was used. Pollen from small buds did not germinate as soon or as well as did pollen from large buds. Pollination of large buds gave better set of fruit than pollination of small buds. Immediate pollination gave better results than delayed, especially in warm weather. The author concluded that pollen remains healthy and viable for long periods if kept dry and at proper temperature. Pollen can endure lower temperatures than pistils. Pollen from trees subjected to 20 and 22°F. when in bloom gave good percentage

germination, but germinated more slowly than normal pollens. Time of day is not important unless decided changes in weather have occurred.—C. S. Crandall.

2406. BABCOCK, E. B. Bud selection and frequency of mutations. Better Fruit 16⁵: 9-10. 1921.—There is little definite information regarding the frequency of bud mutations in varieties of deciduous fruits. Propagation from high-yielding trees is commended, but trees so propagated should not be offered as anything more than first class stock until it has been proved that the high-yielding character of the parent tree has been transmitted. The question as to whether yield of varieties of deciduous fruits can be increased through bud selection is still unanswered and data from careful experiments are needed. Bud mutations appear to be frequent in certain citrus varieties, but it should not be inferred that they occur with equal frequency in apples or other deciduous fruits. Deciduous varieties have arisen as bud mutations, but the number is small and it is fair to infer that mutations resulting in high productivity are rare. Experiments have been limited, but thus far have tended to increase doubt as to the practicability of increasing yield of standard deciduous varieties through bud selection. Advertising stock grown from high producers as insuring high-yielding orchards should be discouraged until results of definite experiments have proved to what extent trees thus propagated excel first-class nursery stock. Bud selection should be encouraged, but the practice does not warrant claims to unusual merits in nursery stock. Keeping performance records of orchard trees is commended.—C. S. Crandall.

2407. BANTA, ARTHUR M., and L. A. BROWN. More eyeless Cladocera. Amer. Nat. 56: 568-571. 1922.—In crowded cultures of daphnids 2 eyeless individuals have occurred in *Moina rectirostris* and 9 in *M. macrocopa*. All showed a reduced optic ganglion and some had abnormal antennae. Several thousand descendants of these 11 eyeless individuals together with some of their collaterals were raised but all were normal, thus showing that eyelessness was not transmitted. External factors are suggested as being responsible for these abnormalities.—D. D. Whitney.

2408. BERTAUX, A. Un cas d'hermaphroditisme androgynoid. [A case of androgynoid hermaphroditism.] Bull. et Mem. Soc. Anat. Paris 1922: 93-94. 1922.—A child of 12 years, previously regarded as a girl, was operated upon for inguinal hernia when a testis was revealed in the canal of Nuck. A brother of 14 is normal as is also a sister of 3, except that the latter has a small strand of tissue bridging the urinary meatus.—C. H. Danforth.

2409. BLARINGHEM, L. Héritéité anormale de la couleur des embryons d'une variété de pois (*Pisum sativum* L.). [Abnormal inheritance of the color of the embryo of a variety of garden pea.] Compt. Rend. Acad. Sci. Paris 174: 877-879. 1922.—Some striking irregularities in the inheritance of embryo color in garden peas are reported. Some lines show the simple 3:1 segregation of yellow to green in the 2nd generation; but certain other strains give irregular ratios in which green is dominant to yellow [see Bot. Absts. 1, entries 1314, 1315]. Such irregular strains are affected by climate, nutrition, and maturity and furnish excellent material for the study of the effect of environmental conditions upon the expression of a character. Because of this reversal of dominance in peas it is necessary to resort to severe selection of lines in order to verify the original work of Mendel.—H. C. McPhee.

2410. BLUHM, AGNES. Zur Erblchkeitsfrage des Kropfes. [The question of inheritance of goitre.] Arch. Rass.- u. Gesellschaftsbiol. 14: 1-9. 1922.—In any study of goitre it is important to distinguish between endemic and sporadic cases. Endemic goitre it would seem may not be hereditary while sporadic forms commonly are. Since the manifestations of goitre are of varying degrees, it is necessary in any thorough-going study of heredity of the condition to examine not only the obviously goitrous members of a family but also those who may seem to be normal. Furthermore it is important to know where each individual has lived at each life period in order to determine the likelihood of endemic ('acquired') goitre. The author endeavors to present a family history which meets these requirements. The

progenitress, of Dutch descent on her father's side, probably had a slight goitre. Of 20 female descendants in 3 generations, 4 have obvious goitres (1 with Basedow's disease); 5, goitres apparent to a trained observer; and 5, goitres recognizable only by palpation or slight thickening of the neck. The remaining 6 either died in infancy or are too young to show the defect. It has not appeared in any male descendant though some have seemed to transmit it. The condition is definitely hereditary but none of the suggested hypotheses offered a satisfactory explanation of its mode of transmission. Nevertheless the author feels that despite its inherent difficulties the heredity of goitre furnishes a promising subject for study in the field of hereditary pathology.—*C. H. Danforth.*

2411. BOUGET, JOSEPH. *Sur les variations de coloration des fleurs réalisées expérimentalement à haute altitude.* [Upon variations in flower color experimentally secured at high altitude.] *Compt. Rend. Acad. Sci. Paris* 175: 900-901. 1922.—Experiments in plants at 2860 m. altitude have shown that the brilliant flower coloring of alpine plants is due to a high percentage of moisture in the atmosphere surrounding the plant and to the intensity of the sun-light reflected from the snow during the flowering period. Temperature had little effect on coloration. The diminution in light intensity resulted in less bright colors.—*J. L. Collins.*

2412. CARON, VON. *Züchtung und Anbau deutscher kleberreicher Winterweizen und ihre Backfähigkeit.* [Breeding and cultivation of German high-gluten winter wheats and their baking qualities.] *Beitr. Pflanzenzucht* 5: 158-168. 1 pl. 1922.—In an attempt to make Germany less dependent on foreign countries for high-gluten wheat, breeding operations were begun in order to produce a new variety suitable both in yield and baking quality, present varieties being inadequate. Hybrids were made in 1911 between Nordstrand, a not very late ripening, northern-grown variety, and Saumur, an early ripening, high-gluten, spring variety from southern France. These 2 parents were morphologically similar, having small, lax, sometimes nodding spikes. This cross gave a squarehead form (thick, compact spike) with reddish-brown, glassy kernels. The dark reddish-brown form was constant to 1914, when reported. Analyses showed the protein content of 2 selections made as 18.08 and 18 per cent, while Nordstrand had 10.87 and Saumur 11.01 per cent. In gluten they were nearly equal to Manitoba wheat, the best foreign kind, and much superior to the ordinary German wheats. They ripen about 14 days earlier than Nordstrand, and a month earlier than the German squarehead wheat. The selections are apparently winter-hardy, as indicated by spreading growth, and not affected by loose smut. The kernels are larger than in the parents. A new hypothesis of inheritance is formulated in which the positive bio-electron of the protein gene of the new individual is lessened by the negative bio-electron of the protein genes of the father and mother, while the negative bio-electron of the protein gene of the new individual absorbs the positive bio-electrons of the parents. [A discussion follows on pages 169-170.] —*C. E. Leighty.*

2413. COFFMAN, F. A. *Pollination in alfalfa.* *Bot. Gaz.* 74: 197-203. *Fig. 1-5.* 1922.—Pollination was studied with reference to 4 arbitrarily chosen stages in floral development: "straight bud" (5-6 mm. in length), "pointed bud" (6-10 mm.), "hooded bud," and "erect standard." It was found that the flowers begin to shed pollen in the pointed bud stage. Since in ordinary hybridizing work dependence is placed upon tripping in the hooded bud stage and subsequent removal of the pollen by washing, it is pointed out that no certainty may be gained that self-pollination has not taken place. The author states that emasculation earlier than the pointed bud stage is practically impossible.—*B. W. Wells.*

2414. FETSCHER, R. *Über die Erbllichkeit des angeborenen Klumpfußes.* [Heredity of congenital clubfoot.] *Arch. Rass.- u. Gesellschaftsbiol.* 14: 39-52. 1922.—Clubfoot is found in about 1 case in 1,000, and commonly in the offspring of normal parents, which suggests that if hereditary it is recessive. That it is in fact hereditary is indicated by a study of 25 family groups. Data previously reported by Besselhangen showed that in the general run of cases 63.7 per cent are males and 36.3 per cent females. The author finds a similar distribution

(67.2 per cent male, 32.8 per cent female), but notes that there is a concomitant disturbance in the sex ratio since in the families studied there are 2 males to 1 female. It might appear from this that the actual incidence of clubfoot is the same for both sexes were it not that such an assumption seems to be precluded by the extensive data of Besselhagen. However, the observed departure from the normal sex ratio is significant and an attempt is made to explain the whole situation on the hypothesis of a special kind of non-disjunction resulting in 3 types of viable eggs. When fertilized by sperm from a heterozygous male such eggs would be expected to produce 3 males to 2 females and among the affected individuals 2 males to 1 female. These expectations agree fairly well with observations except that the actual number of offspring with clubfoot is too small, being, when both parents are heterozygous, about $\frac{1}{20}$ instead of $\frac{1}{3}$ of the children. This discrepancy could be explained by postulating 1 additional recessive factor or 2 dominant ones, which would reduce the expected cases to about the number observed. The author recognizes certain weaknesses in this (rather involved) hypothesis, which is presented merely as a tentative suggestion.—*C. H. Danforth.*

2415. FRATEUR, J. L. *Mendelsche synthetisvormen bij de dieren.* [Mendelian synthetic forms in animals.] *Genetica* 4: 235-246. 1922.—The results of a series of hybridizing experiments with rabbits and the domestic fowl are reported. Phenotypes differing from the ordinary dominant and also from the intermediate F_1 forms can be of 2 classes: (1) an entirely new type, as the result of complementary factors; (2) a mosaic type, through a juxtaposition of 2 dominant characters, 1 of which is possessed by each of the parental types. In the F_2 a dihybrid of class 1 would give the following ratio: 9 N, 3 P, 3 P_1 , 1 N_1 . Crosses of hybrids carrying complementary factors (class 1) as well as those with factors in juxtaposition (class 2) produce corresponding numbers of genotypes in F_2 .—*A. R. Saunders.*

2416. FRECKMANN, W. *Grassamenbau und Gräserzüchtung.* [Grass-seed production and grass breeding.] *Beitr. Pflanzenzucht* 5: 118-128. 1922.—This is a discussion (at plant-breeding conference in 1914) of the practical question of grass-seed production, and a plea for more breeding work on grasses and clovers. The need for better-yielding varieties of hay crops is pointed out, also the use of kinds best adapted to conditions, which would allow the production of sufficient forage on the present acreage of meadow and pasture land and yet maintain the present grain acreage. A discussion follows on pages 128-134.—*C. E. Leighty.*

2417. GARBER, R. J. *Inheritance and yield with particular reference to rust resistance and panicle type in oats.* *Minnesota Agric. Exp. Sta. Tech. Bull.* 7. 62 p., 6 fig. 1922.—A study was made in oat crosses of the inheritance of panicle type and pollen abortion in relation to host reaction to stem rust. A study was made also to determine the correlation between rust reaction and yield and between panicle type and yield. Crosses were made between 2 open-panicled pure lines of oats, Victory and Minota, which are susceptible to stem rust, and a side-panicled pure line, white Russian, which is resistant. The crosses and parents were grown in the field under artificially induced epidemic conditions. Rust resistance behaved as a dominant character depending on 1 main genetic factor for its expression. In the F_2 generation of both crosses, Minota-White Russian and Victory-White Russian, there were 2,340 resistant and 704 susceptible plants. Of 377 F_3 families tested, 106 bred true for resistance, 175 segregated in the ratio 3 resistant to 1 susceptible, and 96 bred true for susceptibility. The F_1 plants are open-panicled but not to the same degree as the open-panicled parents. Of the 377 F_3 families tested, 98 bred true for open panicle, 213 showed segregation, and 66 bred true for side panicle. Rust reaction and panicle type are nearly, if not completely, independent in their inheritance. The Victory parent produced 12.4 per cent aborted pollen. Minota and White Russian produced 1.0 and 0.9 per cent aborted pollen, respectively. Of 250 F_2 plants in the Victory-White Russian cross, 7 produced percentages of aborted pollen within the range exhibited by the Victory parent. In the F_2 generation of the Minota-White Russian cross, rust infection caused a reduction in yield of 12 per cent in the open-panicled plants and 34 per cent among the side-panicled plants; and in the Victory-White Russian cross, 37 per cent among the open-panicled plants and 24 per cent in the side-panicled plants. In the F_3

generation the average percentages of reduction of yield as a result of infection with stem rust were 24, 14, and 37, 30 in the 2 crosses, respectively. In the Victory-White Russian cross the average yield per plant for the resistant forms was 16 per cent greater for the open-panicled types than for the side-panicled types; and for the susceptible forms the yield was 15 per cent greater for the side-panicled types. In the Minota-White Russian cross the average yield in the resistant forms was 14 per cent greater for the open-panicled than for the side-panicled types; and for the susceptible types the open-panicled forms yielded 25 per cent more than the side-panicled forms.—*Fred Griffiee*.

2418. GARBER, R. J. **Origin of false wild oats.** Jour. Heredity 13: 40-48. 1922.—The appearance of false wild oats in cultivated varieties of *Avena sativa* and *A. orientalis* has been explained by Nilsson-Ehle on the basis of loss-mutation and by Tschermak and Zade on the basis of natural crossing. False wild oats were found at University Farm, St. Paul, in 3 cultivated varieties of oats, Victory, Aurora, and Garton 784. The false wild oats in Victory were found in a plant row seeded from a panicle selected the previous year as typical Victory. The false wild plants differed from Victory only in respect to awn development, articulation of seed, and pubescence, and on the basis of these characters homozygous false wild, heterozygous false wild, and Victory plants were distinguished from one another. Victory types and homozygous false Victory bred true. The heterozygous false Victory gave 54 Victory types, 163 heterozygous false wild, and 80 homozygous false Victory. The false wild oats found in Garton 784 behaved similarly to those found in Victory. Homozygous false Garton 784 and homozygous Garton 784 bred true. The heterozygous false Garton 784 gave 81 Garton 784, 122 heterozygous false Garton 784, and 55 homozygous false Garton 784. Summing the results of the Victory and Garton 784, the progeny of the heterozygous false wild types approximates very closely a 1:2:1 ratio.—The false wild oats found in Aurora have the same characteristics of the Aurora except in awn development, articulation of seed, and pubescence.—Crosses between Garton 748, a variety very similar to Garton 784, and wild oats segregated for other characters than awn development, articulation of seed, and pubescence. The controlled crosses of cultivated varieties with the wild oats segregate for other characters than the awn development, articulation of seed, and pubescence, and that these latter characters are due to 1 main genetic factor is taken as evidence against the explanation of the appearance of false wild oats as due to natural crossing and in favor of the view of mutation.—*Fred Griffiee*.

2419. GATES, R. R. **Interspecific sterility.** Nature 110: 179-180. 1922.—Bateson [Nature 110: 76. 1922.] lays insufficient emphasis on certain facts. Considering organisms in general interspecific sterility appears not so general as was formerly assumed. Among animals it is more widespread. The case of *Drosophila melanogaster* × *D. simulans*, which gives sterile hybrids although the 2 are similar and have similar chromosome groups, corresponds exactly with Bateson's conception of interspecific sterility. But it is an extreme case.—While agreeing that tetraploids frequently do not breed freely with diploids, Bateson regards the applicability of such an example doubtful because a tetraploid must be considered "an unresolved pair of twins," hence not a "specifically distinct organism." Bateson scarcely recognizes the intimate nature of the union involved. This union in *Oenothera gigas* not only increases cell size but alters cell shapes. Genetic behavior of *O. gigas* indicates some change in germ plasm in addition to chromosome doubling. This is shown by comparing *O. gigas* with Winckler's *Solanum* tetraploids, obtained by grafting; the latter are merely stouter without alteration in shape of parts or organs.—Wide occurrence and evolutionary significance of tetraploid species is not generally recognized. Tetraploidy bars free crossing with diploid forms in any line of descent. Tetraploid forms may be regarded as mutations significantly accompanied by partial interspecific sterility. The cross-breds with unbalanced chromosome groups tend to be eliminated, while each pure form perpetuates itself.—*E. B. Babcock*.

2420. GRIFFITH, C. R. **Are permanent disturbances of equilibration inherited?** Science 56: 676-678. 1922.—White rats were horizontally rotated day and night, 60-90 times a minute, for several months. Some weeks after removal there appeared circular movements of the body

and twistings of the head, and some died from an affection of the ear. When mated, some of the progeny, which had never been rotated, showed symptoms of the same kind. Further investigations with a new stock are in progress.—*John Belling*.

2421. GUYER, M. F. [Rev. of: NEWMAN, H. H. *Readings in evolution, genetics and eugenics*. xviii + 523 p. Univ. of Chicago Press: Chicago, 1921.] *Science* 56: 451. 1922.—Presentation in a single text book of materials necessary to be gleaned from numerous volumes. The book is not a patchwork but surprisingly unified. Minor mistatements and contradictions in former separate treatises are reduced to a minimum. A glossary of scientific terms is needed. For courses in evolution, variation should be given before or along with causal factors of organic evolution. Evidences from morphology would be better presented before those from paleontology. Chapters on neo-Mendelian heredity, sex-linked and other kinds of linked inheritance, and linkage and crossing-over are too difficult for the beginning student. "For the general student this is the most complete and acceptable one-volume account of organic evolution and allied subjects in print."—*D. F. Jones*.

2422. HANISCH. *Tätigkeitsbericht der Pflanzenzuchtstation Ung.-Brod*. [Accomplishments of the plant breeding station of Broder, Hungary.] *Wien. Landw. Zeitg.* 72: 95-96. 1922.—A winter hardy rye ripening 6-8 days earlier than the parents was selected out of a cross, Hanna × Blue Petkuser. The hybrid possesses other desirable commercial qualities. Several crosses with summer barley are described, and types which are superior in adaptability to heavy soils and freedom from lodging are being selected. In pea-hybridization studies, one of the objects is to secure resistance to black aphid, one of the most serious enemies of pea culture. Potato breeding and variety testing studies are in progress, the object being to find varieties better adapted to Hungary's heavy soils.—*F. Weiss*.

2423. HARLAND, S. C. *Inheritance in Ricinus communis L.* *Jour. Genetics* 12: 251-253. 1922.—Further data are presented on the segregation of factors in the castor-oil bean [see *Bot. Absts.* 1, Entries 249; 2, Entries 939, 952]. By back-crossing, factors *M* (mahogany) and *B* (bloom) were found to be linked and factors *G* (green) and *B* and also *M* and *G* to be independently inherited. No repulsion was found between factors *S* (spines) and *G* although more data are necessary to establish this point.—*Richard Wellington*.

2424. HARRIS, G. W. *Inheritance of a cheek-mole*. *Nature* 109: 78. 1922.—A man with a mole on the middle of the left cheek has 2 daughters with similar moles in almost exactly the same place. His sons do not have cheek moles but a daughter of one of them shows the trait.—*C. H. Danforth*.

2425. HARRISON, J. W. H. *Interspecific sterility*. *Nature* 110: 312. 1922.—*Salix* spp. are discussed.—*O. A. Stevens*.

2426. HAYES, H. K., AND H. D. BARKER. *The effects of self-fertilization in timothy*. *Jour. Amer. Soc. Agron.* 14: 289-293. 1922.—Self-fertilized clonal lines of timothy differed widely. This was probably due to genetic causes as there was marked correlation between the percentage of seed set under various conditions. Five out of 11 first-year, self-fertilized strains gave some albino seedlings in their progeny.—*F. M. Schertz*.

2427. HUBBS, CARL L. *Variations in the number of vertebrae and other meristic characters of fishes correlated with the temperature of water during development*. *Amer. Nat.* 56: 360-372. 1922.—This work parallels that of Johannes Schmidt [see *Bot. Absts.* 11, Entry 314]. The work of both indicates "that the meristic characters displayed by an individual fish are determined not alone by heredity, but in part also by the environmental conditions, particularly temperature, which prevail during some sensitive developmental period."—*Robert K. Nabours*.

2428. HURST, C. C. **Origin of the moss rose.** Rept. British Assoc. Adv. Sci. 1921: 453. 1921.—The rose differs from the old Cabbage Rose only in its glands, yet 12 authors give it specific rank. Sterility makes genetic investigation difficult, but bud variation seems to throw light on constitution.—*E. B. Babcock.*

2429. JACK, H. W. **Selection of coconuts.** Malayan Agric. Jour. 10: 122-127. 1922.—Selection of coconuts for planting is very desirable, as for instance among 453 12-year-old trees under observation individuals have varied in yield from 7 to 180 nuts per annum. Preliminary observations indicate that at least 10 per cent of the progeny do not come true to type. Races are characterized by the amount of copra yielded, but this falls off in age. Selection for planting by character of the nut must yield to selection by tree; and of all tall races, those with large nuts appear unacceptable, because the races possessing them produce few nuts; also races with oblong nuts seems to yield relatively less copra than medium-sized rounded nuts. But much work is needed. Whether any dwarf race can be held more desirable for planting than tall races is unsettled.—It appears that the nature of the oil varies too little between races to be worth using in selection.—*I. H. Burkill.*

2430. JACK, H. W., AND W. N. SANDS. **The dwarf coconut in Malaya.** Malayan Agric. Jour. 10: 4-12. 1922.—The dwarf coconut, or in Malay, Nyior Gading, is evidently exotic to the Malay Peninsula and may have been imported first about 30 years ago from the Netherlands Indies. It is different from the King coconut of Ceylon, which race approaches the "nyior puyoh" of the Peninsula. The authors compare "nyior gading" with the King coconut and the "Coco Mino," a dwarf coconut of the Philippine Islands. The authors look upon all these dwarfs as mutants.—"Nyior gading" contains several races distinguished by the color of the nut, 3 of which are described. "It is quite evident that natural crossing takes place between tall and dwarf races so that semi-talls . . . occur." Careful breeding experiments only can determine the relation of the factor of dwarfness to tallness; but the dwarf is said to give 80 per cent true to type in color of the nut, etc.—In an experiment with 1,270 seed-nuts, 96.2 per cent came true ivory-yellow dwarf, 68.7 per cent came green dwarf and 74.6 per cent true red dwarf, the flowers giving the nuts having been left to natural pollination.—"In the warm humid atmosphere of the lowlands of Malaya, the length of the duration of the male phase of the flowering palm is curtailed and the female phase would appear to be longer both in tall and dwarf races;" further "in Malaya the female phase not only begins, but most frequently ends before, or at the same time, as the male phase, thus rendering self-pollination the rule." The average duration of the male phase of the dwarf coconut was found to be 21 days and of the female 8 days [misprinted 3 in one place]. There are on the average 4-day intervals between the end of one phase of the tree and the beginning of the next phase, i.e., in the sequence of inflorescences. The end of the female phase in 43 inflorescences was never more than 3 days behind the end of the male phase, when pollen might still function from the dead male flowers. The pollen is wind-borne, but the authors conclude that "the flowers are as a rule self pollinated in the lowlands of Malaya." [It would appear that they mean from one flower in the inflorescence to any other as readily as to itself.]—*I. H. Burkill.*

2431. JONES, D. F. **The productiveness of single and double first generation corn hybrids.** Jour. Amer. Soc. Agron. 14: 241-252. 1922.—A general summary is presented of the relative yields of local varieties, inbred strains, single crosses and double crosses (crosses between 2 F_1 single crosses) of maize in Connecticut. With few exceptions the double crosses outyield the other classes but the fact is appreciated that the production of such seed at a cost low enough to be an important factor in corn growing remains to be demonstrated.—*J. H. Kempton.*

2432. KEITH, ARTHUR. **The stature of the Scottish people.** Nature 110: 8. 1922.—This article quotes a letter from ALEŠ HRDLÍČKA of the United States National Museum, stating that, through an error of computation, the stature of the Scottish people as given in the Final Report of the Anthropometric Committee of the British Association (1883) is too high. The corrected heights are: Scottish, 172.9 cm.; Irish, 172.6 cm.; English 171.2 cm.; Welsh, 169.4 cm.—*O. A. Stevens.*

2433. LEAKE, H. MARTIN, AND B. RAM PERSHAD. The coloration of the testa of the poppy seed (*Papaver somniferum* L.) Jour. Genetics 12: 247-249. 1922.—Three pairs of genes are stated to affect the seed color of the opium poppy. (1) *S* with *pp* causes straw color. *SS* is not markedly distinguishable from *Ss*. (2) *P* with *ss* and *bb* causes pink color, seen only in bulk. *PP* and *Pp* are indistinguishable. (3) *B* with *P* and *ss* gives blue. (4) *S* and *P* with *bb* give brown, which is with difficulty distinguished from homozygous straw; but all plants with *P* have color in the eye of the petal. (5) *SSPPBB* is deep purple, while *Ss* is gray, and the 2 intergrade. $\frac{3}{4}$ (6) Linkage is stated to occur between *S* and *B*.—John Belling.

2434. MENDIOLA, NEMESIO B. Improvement of the Lanzon (*Lansium domesticum* Jack). Philippine Agric. 11: 117-123. 1 pl. 1922.—Studies have been begun on improvement of *Lansium domesticum* by multiplication of the sweetest varieties, multiplication of varieties or bud mutations producing seedless or nearly seedless fruits, elimination of the milky juice of the rind and the bitter taste of the seed covering, elimination of the loose tissues lying at the center of the fruit between the fruit segments, and production of better-yielding strains. Six distinct types of trees are described; these differ in period required for flowering and fruiting, and in sweetness, form and size, flavor, quality, and seedlessness of fruit. Though commonly grown from seed, the tree may be propagated by marcottage, air layering, and graftage, and it is hoped that desirable forms may be preserved by these methods. Correlation between seedlessness and symmetry of fruit was determined for 478 fruits, and was found to be $+0.741 \pm 0.014$. It was found that 208 non-symmetrical fruits contained seed, 102 non-symmetrical fruits were seedless, 39 symmetrical fruits contained seed, and 129 symmetrical fruits were seedless.—Sam F. Trelease.

2435. MORGAN, THOMAS H. Some possible bearings of genetics on pathology. (Middleton Goldsmith lecture, 1922.) 33 p., 14 fig. New Era Printing Company: Lancaster, Pennsylvania, 1922.—Genetic interpretation of pathological characters, its accuracy, and possible effects are discussed. Inheritance of shortened 1st digits is cited as an illustration of dominance and of a lethal when homozygous. Hemophilia and color-blindness are cases of sex-linked inheritance. Inheritance of so-called blood groups on Mendelian assumption of 2 pairs of factors is demonstrated. Individuals belonging to same group do not agglutinate each other's blood, but corpuscles of *AA* or *Aa* individuals are agglutinated by *aa* and *BB* or *Bb* individuals by *bb*. Height or stature is probably an hereditary trait, with glandular and probably also quantitative chemical background. The author suggests caution in interpretation of feeble-mindedness as due to simple Mendelian difference. Immunity and disease are discussed with special reference to the cancer problem. Cases in higher mammals in which an induced variation is said to be inherited are of great interest to pathology. Application of genetics to pathology is pioneer work. The danger in drawing premature conclusions from insufficient evidence is pointed out.—E. E. Jones.

2436. NIKOLAWEA, A. [German rev. of: NIKOLAWEA, A. Zur Cytologie der Triticumarten. (On the cytology of Triticum-species.) Verhandl. Kongr. Pflanzenzücht.: Saratow, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 208-209. 1922.—Chromosome counts of wheat species were made from vegetative cells. *Triticum monococcum* has 14 chromosomes; *T. durum*, *T. polonicum*, *T. turgidum*, and *T. dicoccum*, 28; *T. vulgare*, 42-44; *T. spelta*, 44; and in 1 case 50 chromosomes were counted in *T. compactum*. The cytological grouping is in accord with Tschermak's genetic classification, with Zade's serological classification, and with Vavilov's classification in respect to disease resistance.—Karl Sax.

2437. NIKOLAWEA, A. [German rev. of: NIKOLAWEA, A. Zur Kenntnis der Chromosomenzahl in der Gattung Avena. (Chromosome number in the genus Avena.) Verhandl. Kongr. Pflanzenzücht.: Saratow, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 209-210. 1922.—*Avena brevis*, *A. strigosa*, and *A. nuda biaristata* have 14-16 chromosomes; *A. sterilis*, *A. Ludoviciana*, *A. byzantina*, 44; *A. fatua*, *A. sativa*, *A. nuda inermis*, 48; and *A. barbata*, 32. Preparations were made from root tips.—Karl Sax.

2438. PATER, B. Eine neuere Abnormität an *Digitalis purpurea* L. [A new abnormality in *Digitalis purpurea* L.] Zeitschr. Pflanzenkrankh. 32: 97-102. Fig. 1-3. 1922.—Cases of pelorism and color variation in blossoms have occurred for several years in the author's experiment plots of *Digitalis purpurea*. In 1921 an abnormal plant was found, characterized by frequent branching and erect flowers like those of *Pentstemon*, some green in color, others dark brownish red. In some blossoms the crown was split into 2 parts; others remained entire, a long green, branched shoot bearing small leaves and rudimentary blossoms developing from the center. Many cases of pelorism were also observed, all of them occurring in a plot into which plants had been transplanted, none being found in plots where plants had grown from seed. The author's observations agree with those of Peyritsch that pelorism occurs most frequently among plants subjected to a change in living conditions.—*Edith K. Cash.*

2439. PEACOCK, A. D. Pairing and parthenogenesis in saw-flies. Nature 110: 215. 1922.—Females of *Athalia liniolata* Lep. are much more abundant than males. Males of *Pristophora pallipes* Lep. are extremely rare. No males of *Allantus pallipes* Spin. have been taken or bred. When bred parthenogenetically, about 30 species produce males only; about 13, females only; about 6, both sexes. Many species are facultatively parthenogenetic. Certain species refuse to mate in captivity. *Athalia liniolata* mated and was probably polyandrous. Females of *Platycampus lucidiventris* Fall. ignore males and lay eggs parthenogenetically. Virgin females of *Phymatocera aterrima* Kl. and *Nematinus luteus* Panz. laid eggs which produced larvae and then paired with males. Varied conditions are regarded as of value in regulating sex ratio.—*P. W. Whiting.*

2440. PUNNETT, R. C. On a case of patching in the flower colour of the sweet pea (*Lathyrus odoratus*). Jour. Genetics 12: 255-281. 1 pl., 3 fig. 1922.—The author gives the genetical behavior of patching in the flower color of the sweet pea. Plants or shoots, bearing these patched or mosaic flowers, are affected in habit of growth, being less luxuriant than normals. All tested plants, showing mosaic flowers, were found to be heterozygous, producing normal, patched, and red flowers in varying proportions. Since expected Mendelian ratios did not occur, the inheritance of patching in the sweet pea was thought to be possibly analogous to reported cases of flaking in *Mirabilis* and *Primula*, variegation in maize, and striping in *Antirrhinum*. Hypothetical explanations are given as to why irregular segregations occurred.—*Richard Wellington.*

2441. RIS, VICTOR. Some notes on rubber estates of the future. Malayan Agric. Jour. 10: 112-117. 1922.—A paper in the Archief voor de Rubberecultuur is reprinted indicating the great importance of selection work in the present competition for existence between rubber plantations.—*I. H. Burkill.*

2442. ROBERTS, H. F. A new method of corn improvement by selection. Sci. Agric. 3: 37-50. 1922.—Following an extensive review of the literature on the subject of selection in maize the author proposes 3 methods of breeding corn: 1 adapted for experiment stations, 1 for commercial breeders, and the 3rd for the farmer. These systems all involve various modifications of the ear-to-row method. The effect of selection of various plant and ear characters on yield of grain is summarized and a comprehensive bibliography is appended.—*J. H. Kempton.*

2443. SALAMAN, REDCLIFFEN. The inheritance of fur types and hair characters in rabbits. Jour. Genetics 12: 179-207. 24 fig. 1922.—Following on research of inheritance of human hair shape, the author investigated a series of rabbit skins lent him by C. C. Hurst, upon which the latter founded his research on the heredity of coat characters [HURST, C. C. Experimental studies in heredity in rabbits. Jour. Linn. Soc. Zool. 29: 233. 1905]. There are 2 distinct types of fur in the rabbit, designated in this paper as "A" and "B" types. "A" is common to the wild and all short-coated rabbits, and in addition it is found in some Angoras. There is no correlation between either of the 2 types and coat color or other distinctive patterns

recognized by the fancier or with sex. "B" is a type exclusively found in some long-coated rabbits. There are 3 shapes common to the transverse sections of the Small-hair at the skin level, square, round, and oval. The square type is recessive and can occur pure, the round type is dominant to the square and was found pure only in relation to "B" type pelts; the oval is the form most in evidence in the wild rabbit, and is the normal dominant form in short-coats. In certain rabbits exhibiting the Dutch marking, transverse sections of the Small-hairs in the white areas are found to be of a square shape, and those in the dark of a round or oval shape. This condition is to be found on both short- and long-coated Dutch marked animals. In 1 instance where the Dutch pattern was developed in an animal, heterozygous for square and round hair section, as well as "A"- and "B"- pelt types, a differentiation took place so that the white area presented entirely different hair characters from that existing in the dark portion. The differentiating factor, whether heterozygous or otherwise, is able to influence the hair shapes much more completely in an animal which is pure for the Dutch pattern factor than in one which is heterozygous and which exhibits the presence of the factor only by the "marking" on the shoulder. The suggestion is made that the extreme looseness and elasticity of the ordinary rabbit pelt in life is associated with the physiological requirements of the hair follicles, which at certain recurrent phases of the coat's growth, must accommodate hairs the transverse area of which is as much as tenfold that of the same when fully grown.—*Redcliffe N. Salaman.*

2444. SANDO, C. E., AND H. H. BARTLETT. **Pigments of the Mendelian color types in maize: isoquercitrin from brown-husked maize.** Jour. Biol. Chem. 54: 629-645. 1922.—The chemical nature of plant colors is discussed and the desirability of correlating chemical compounds with genetic factors is pointed out. For this purpose color types of maize have been chosen and a brief description of the interaction of 3 plant color factors, *A*, *B*, and *Pl*, proposed by Emerson, is given. A flavonal glucoside known as isoquercitrin has been isolated from the husks of Emerson's brown type of maize having the factorial composition *aa*, *BB*, *Pl Pl*. This glucoside is identical with that originally found by Perkins in cotton flowers and probably also with a similar substance derived by Heyl from the pollen of ragweed. The relatively large yield of this glucoside from maize has made it possible to add to the characterization of isoquercitrin by Perkins and the methods by which it was extracted and identified are given in detail.—*J. H. Kempton.*

2445. SCHEGALOW, S. [German rev. of: SCHEGALOW, S. **Das Erscheinen des Gigantismus beim Hafer.** (The appearance of gigantism in oats.) Verhandl. Kongr. Pflanzenzücht.: Saratow, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 207-208. 1922.—Gigas types of individuals were found in a selection of *Avena orientalis*. They constituted about 25 per cent of the progeny of 1 selection and bred true in later generations. The gigas type was relatively sterile and under usual conditions matured very late. The chromosome number was found to be the same as for the normal form.—*Karl Sax.*

2446. SCHMIDT, JOHS. **Diallel crossings with the domestic fowl.** Jour. Genetics 12: 241-245. 1922.—Two cocks, X and Y, of mixed breeding were each mated with the same 5 hens, a, b, d, e, and f, and 5 progeny from each mating—making a total of 50 chickens—were studied. The number of vertebrae in each individual was counted. The average number of vertebrae in the 25 daughters of each cock is called his "generative value" and the actual number of vertebrae in his body, his "personal value." The same application is made to the hens.—*F. A. Hays.*

2447. SHULL, G. H. **Über die Heterozygotie mit Rücksicht auf den praktischen Züchtungserfolg.** [On heterozygosis with emphasis on the practical breeding results.] Beitr. Pflanzenzücht 5: 134-152. 9 fig. 1922.—Self-fertilized strains of maize when crossed gave increases in yield of grain of 380 per cent above the inbred parents in the 1st generation, 41 per cent in the 2nd, and 27.4 per cent in the 3rd. The best *F*₁ crosses exceeded the original cross-pollinated variety by 20 per cent. The coefficient of variability of the inbred strains

was 9.08 per cent, for F_1 , 9.06 per cent, and for F_2 , 12.63 per cent. The increase in size and vigor resulting from crossing is called heterosis and is interpreted as due to a stimulation accompanying heterozygosis. While selection of the best individuals for breeding purposes in self-fertilized, homozygous plants is justified, on account of heterosis the best individuals in cross-fertilized plants and in animals are not the ones which always give the best results. [A discussion follows on pages 152-158.]—D. F. Jones.

2448. SMITH, LOREN B. **Breeding mosaic resistant spinach and notes on malnutrition.** Virginia Truck Exp. Sta. Bull. 31/32. 138-160. 1920.—The author discusses chiefly methods used in the development of the Virginia Savoy, a mosaic-resistant spinach. The resistance factor was obtained from a variety of spinach known as Manchuria obtained by the late Frank M. Meyer, near Liaoyang, Manchuria. The latter variety furnished the female and the varieties Round Thick-leaf Winter, Bloomsdale Savoy, Long Standing, and Viroflay the male parentage of the best strains of the Virginia Savoy. "The hybrids after several years of field selection and roguing, gradually developed a fairly uniform type and a high degree of mosaic resistance." In selecting desirable strains the characters taken into consideration were (1) resistance to mosaic, (2) size of plant, (3) savoying, (4) color, (5) thickness of leaves, (6) closeness, (7) shape of leaves, (8) long standing qualities, (9) type of growth, (10) number of shoots at crown, and (11) color of petioles. Besides being resistant to mosaic, the Virginia Savoy is less attractive to aphids than other commercial varieties. In Feb. 1918, field counts showed 3.2 per cent of commercial Savoy plants uninfested while 69.1 per cent of the Virginia Savoy plants were uninfested. This was found to hold true repeatedly under greenhouse, field cage, and field conditions. The author states, however, that "during the periods favorable for the development of aphids the Virginia Savoy stocks may become as heavily infested as other varieties." By rigid selection of stocks the mosaic was decreased from 6.14 per cent in the F_2 Manchuria-Savoy hybrid generation to 0.64 per cent in the F_3 generation. "The Virginia Savoy variety compares favorably with the commercial strains in the production of marketable spinach. In 1918 the former yielded 146 barrels and the latter 135 barrels per acre."—H. A. Jones.

2449. SPRAGUE, T. A. **Meristic variation in *Papaver dubium*.** Jour. Bot. 60: 299-300. 1922.—Variation is noted in the number of stigma-rays. Poorly nourished plants have fewer and well nourished more rays than the average. A positive correlation was observed between number of flowers per plant and number of stigma-rays per flower.—J. L. Collins.

2450. STOUT, A. B. **Preliminary report of investigations with species of *Lilium*.** Jour. New York Bot. Gard. 23: 155-158. 1922.—Over 30 species of lilies have been studied. Lack or irregularity of seed production in these *Liliums* was shown to be due mainly to self or cross incompatibility. Varieties from China are being crossed with cultivated strains of the same species to test for cross compatibility. Several species of *Lilium* native to the U. S. A. have been successfully crossed. The chief aims of the work are to determine cultural requirements; and to study self and cross compatibility, the limits of hybridization, and the natural relationships of the varieties and species.—John Belling.

2451. SÜFFERT, F. [German rev. of: KNOLL, FRITZ. **Insekten und Blumen. Experimentelle Arbeiten zur Vertiefung unserer Kenntnisse über die Wechselbeziehungen zwischen Pflanzen und Tieren. (Insects and flowers. Experimental work to enlarge our knowledge of the mutual relations between plants and animals.)** Abhandl. Zool.-Bot. Ges. Wien 12: 119 p. 1921.] Zeitschr. Indukt. Abstamm. -u. Vererb. 29: 202-207. 1922.—As the elements in flower biology K. Chr. Sprengel has listed the sexual apparatus, nectar, corolla color, and fragrance; of these Knoll investigated place of corolla color and fragrance in insect attraction. He used *Bombylius fuliginosus* (bee-fly) and *Muscari racemosum* (grape hyacinth), the latter having a spike of sterile, closed, and odorless flowers at top and fertile, fragrant flowers with nectar below. Evidence from work on distribution of odor, separation of odor from color stimuli, neutralization of color, blue and gray papers indicate reaction of insect to hue and

not to brightness value or odor, at a distance. After insect has approached blossom, odor is responsible for attachment to it. Further work indicates positive reaction of *Bombylius fuliginosus* to blue and disregard of yellow flowers even though they contain nectar, except after the *Muscari racemosum* season is over. *Bombylius medius*, which uses pollen as well as nectar, reacts positively to yellow flowers. *B. fulvescens*, which like *B. fuliginosus* uses only nectar, reacts only to blue flowers. Where *B. fuliginosus* occurs all flowers offering nothing to it are yellow and this may account for connection with non-yellow flowers.—Süffert suggests possibility of inherited reaction here, though acquirement of relationship between insect and flower is not excluded. He considers the importance of researches of this kind to consist in the analysis of specific cases of adaptation, and commends the author's efforts to set forth purely objectively what has hitherto been under the cloud of teleological and "purposeful" speculations.—Helen D. Hill.

2452. SUMNER, FRANCIS B., MARY E. McDANIEL, AND RALPH R. HUESTIS. A study of influences which may affect the sex-ratio of the deer mouse (*Peromyscus*). Biol. Bull. 43: 123-165. 7 fig. 1922.—Data are based on over 4,600 deer mice of known sex, born and raised in captivity, under temperature conditions approximating those existing in nature. Litter size 1 to 9, mean of 1,567 litters, is 3.22. Sex ratio for the whole population is 97.37 ± 1.93 . When only litters in which no deaths are known to have occurred are included, the sex ratio becomes 98.01 ± 2.07 . Litters known to have been incomplete give a ratio of 93.08 ± 5.25 . To eliminate the effect of seasonal differences, the mean of the monthly means was computed and found to be 95.65. The authors state that none of these figures differs significantly. Probable errors in this paper were based on a formula giving about twice as great errors as that employed by previous writers, and the probabilities claimed by the authors are correspondingly lower. A definite seasonal cycle seems to exist in the proportion of males to females born. Two annual maxima occur, in Mar.-Apr. and Aug.-Oct.; the lowest ratio is 78.79 ± 6.93 in Nov., the highest 113.04 ± 8.04 in Apr. This difference is $3\frac{1}{2}$ times the probable error and would ordinarily be considered significant. But when the material is subdivided differently the results are in some cases contradictory and the authors do not regard the existence of seasonal cycle in sex ratio to be proved conclusively by their data. "Subspecific" hybrids (1,722) give mean ratio of 104.76 ± 3.41 . Mice of "pure" race (2,930) give mean ratio of 93.27 ± 2.32 . Positive correlation exists in this material between size of litter and sex ratio. Litters of 1-3 give mean ratio of 94.85 ± 2.94 , those of 4-9 give mean ratio of 102.42 ± 3.01 . Size of probable errors raises question as to significance of this correlation, however. No preponderant tendency toward production of homosexual litters was found, thus no likelihood that polyembryony is at all common. Sex ratio is lower for earlier litters (91.7) than for later ones from the same mother (103.3); numbers are small, however, inbreeding and outbreeding seem to have had no effect. Negative results were obtained from comparison of offspring of meat-fed individuals with offspring of individuals with strictly vegetarian diet; numbers here were also small. The most significant result, statistically speaking, is the fact that sex ratios for the 7 different years included in the records show wide variation, ranging from 125.36 ± 7.82 in 1916 to 70.56 ± 4.70 in 1917. This difference is not due to seasonal distribution of births, nor to preponderance of hybrid births, nor to operation of any other recognized factors.—E. E. Jones.

2453. TSCHERMAK, E. [Rev. of: (1) BAUR, E. Die wissenschaftlichen Grundlagen der Pflanzenzüchtung. Ein Lehrbuch für Landwirte, Gärtner und Forstleute. (The principles of plant breeding. A textbook for agriculturists, gardeners and foresters.) v + 120 p., 6 pl., 11 fig. Gebrüder Borntraeger: Berlin, 1921 (see Bot. Absts. 12, Entry 1034). (2) FRUWIRTH, C., und TH. ROEMER. Einführung in die landwirtschaftliche Pflanzenzüchtung. (Introduction to agricultural plant breeding.) 150 p., 4 pl., 27 fig. Paul Parey: Berlin, 1921.] Wiener Landw. Zeitg. 72: 1922.—The first book is to be recommended for the progressive farmer or gardener who wishes to know the essentials of the theory and practice of plant breeding; the 2nd serves a very useful purpose in providing instructors of plant breeding with an inexpensive text which is more suitable for general students than Fruwirth's Handbook of Agricultural Plant Breeding. [See also Bot. Absts. 11, Entry 2472; 12, Entry 1784.]—F. Weiss.

2454. TORNAU. Die Züchtung des Göttinger Roggens. [The breeding of Göttinger rye.] Jour. Landw. 70: 171-190. 1922.—Selections of 3 lines of Göttinger rye grown for 10 years and 1 pure line grown for 6 years show no decreased yield due to inbreeding. It is shown by statistical methods that inbreeding did not change the relation of various morphological characters.—Karl Sax.

2455. UPHOF, J. C. TH. Eine polymorphe F_1 -Generation aus der Kreuzung von *Phaseolus vulgaris* und *Phaseolus multiflorus*. [A polymorphous F_1 generation from crossing *P. vulgaris* and *P. multiflorus*.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 186-192. 1922.—In crosses of varieties of *Phaseolus vulgaris* \times *P. multiflorus* F_1 plants were obtained which differed greatly in size, leaf shape, and size of seed. The F_1 flower color and seed color was like that of the male parent.—Karl Sax.

2456. WARREN, ERNEST. A preliminary account of an interspecific hybrid and backcrosses of *Digitalis*. South African Jour. Sci. 18: 359-373. Pl. 4-5. 1922.—Results are recorded of hybrids between *D. gloxiniaeflora* and *D. lutea* and also of backcrosses of the hybrid with the parent species. Crossing the 2 species was found to be more difficult when *D. lutea* was used as the seed plant instead of *D. gloxiniaeflora*. The hybrids resembled *D. gloxiniaeflora* more closely than *D. lutea* in general appearance, in relative width of leaf, length and breadth of flowers, and ratio of these dimensions.—The data obtained from backcrosses of the hybrids with both parents is tabulated. In the characters measured, the factors appear to blend on crossing rather than to remain unchanged. "In all the measurable characters examined there was no clear reappearance in the backcrosses of the grandparental characters in an uncontaminated condition. The view that these results are due in every case to the existence of multiple, independent, unchangeable factors would be only justified if the backcross offspring exhibited exceptional variability, but such is not the case. Thus the results obtained with interspecific hybrids resemble those found with intervarietal hybrids." [See also following entry].—Edith K. Cash.

2457. WARREN, ERNEST. Inheritance in the foxglove, and the result of selective breeding. Biometrika 14: 103-126. Pl. 1. 1922.—Additional data on crossing *Digitalis gloxiniaeflora* are recorded in continuation of experiments previously reported [see preceding entry]. The author concludes that "the mode of inheritance is Mendelian with reference to the qualities peloric and non-peloric, purple and white corolla, purple spots and brown spots. If, however, there are any marked differences in the intensities of these qualities, the mode of inheritance of the intensity of the quality was found to be of the blended type. The other characters examined were quantitative in nature, such as degree of the development of purple spots and the ratio of breadth to length of corolla, and these characters blended completely. The evidence of the present investigation is therefore definitely against any general application of the theory of pure-lines and of genotypes of any appreciable magnitude, and further it indicates that selective breeding within self-fertilised generations of a homogeneous race is capable of modifying that race to a marked degree."—Edith K. Cash.

2458. WINGE, Ø. One-sided masculine and sex-linked inheritance in *Lebister reticulatus*. Jour. Genetics 12: 145-162. 2 pl. 1922.—The secondary sex-characters in *Lebistes* are inherited as either one-sided masculine with the X-chromosomes empty, or as a one-sided masculine and sex-linked combination with the X-chromosome containing factors for color. "The whole mode of inheritance is sex-limited to the male individuals, as the factors are found cryptomerically in the females." The condition is the opposite of that in *Drosophila* as the Y-chromosome carries color factors in all the races examined. The principle difference between the X- and Y-chromosomes is that the male sex is represented by a dominant factor in the latter and the female sex by the allelomorphic factor in the former. Crossing over appears to occur rarely between the X- and Y-chromosomes. The females have 44 + X + X chromosomes and the males 44 + X + Y. The genotype of each male may be determined by observation of the color effects. The females all present the same appearance.—Robert K. Nabours.

2459. WOODWORTH, C. M. **The extent of natural cross-pollination in soybeans.** Jour. Amer. Soc. Agron. 14: 278-283. 1922.—Natural hybrids are shown to occur in the soybean. In a total of 205 seed from recessive white-flowered plants, none proved to be hybrid. When cotyledon color was used as an index of hybridity, only 3 pods in a total of 7,480 contained hybrid seed. If all of the ways in which crossing may occur are taken into account the proportion would be 1 hybrid pod in 625, or 0.16 per cent. The variety, locality, and season will cause the percentage of cross pollination to vary. Hybrids may also arise by mutation.—*F. M. Schertz.*

HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issues Entries 2229, 2269, 2284, 2294, 2327, 2343, 2390, 2400, 2401, 2405, 2406, 2428, 2429, 2430, 2434, 2441, 2448, 2510, 2673, 2696, 2698, 2785, 2792, 2795, 2811, 2812, 2891)

FRUITS AND GENERAL HORTICULTURE

2460. ANONYMOUS. **Fruit-growing and research.** Nature 110: 497. 1922.

2461. ANONYMOUS. **The 1922 fruit crop.** Jour. Dept. Agric. Ireland 22: 285-286. 1922.—The general effects of weather, insects, and diseases on apples, pears, and other fruits are noted.—*Donald Folsom.*

2462. ANDREWS, J. W. **Refrigeration and pre-cooling of citrus fruit.** Proc. Florida State Hort. Soc. 35: 59-62. 1922.—This is a report on experiments in pre-cooling oranges in Florida. Under the most favorable conditions it requires 6 hours to cool the fruits in a single box from 85 to 40°F., and to this 1 hour must be added if the "wad pack" is used. If a large number of boxes are stacked in a typical pre-cooling room it requires 3-4 times as long. A study of individual car records indicate that under ordinary conditions icing in transit is not necessary.—*J. C. Th. Uphof.*

2463. BARTLETT, R. G. **The cultivation of ginger.** Agric. Gaz. New South Wales 33: 818. 1922.—Two-eyed sets are planted in 2-foot drills 9 inches apart to a depth of 3 inches in manured soil. The crop is harvested in the flowering stage and yields 2-4 tons per acre.—*L. R. Waldron.*

2464. BARTLETT, R. G. **The manuring of bananas.** Agric. Gaz. New South Wales 33: 830-832. 1922.—The importance of humus and the value and kinds of cover crops are discussed. Two fertilizers rich in potash are suggested.—*L. R. Waldron.*

2465. BECKWITH, CHARLES S. **August flooding for cranberry girdler.** Proc. Amer. Cranberry Growers' Assoc. Proc. Ann. Conv. 53: [Pages unnumbered.] 1922.—Damage in New Jersey by cranberry girdlers was increasingly severe in 1921-1922. Flooding the bogs for 24 hours in early August causes the girdlers to float ashore where they are destroyed by predaceous insects. (Girdlers submerged in cheese cloth bags were killed in 24 hours.) This resulted in lessened infestation the succeeding year. Flooding in August is dangerous and should be used only as a last resort in serious infestations.—*J. K. Shaw.*

2466. BIOLETTI, FREDERIC T. **Pruning young olive trees.** California Agric. Exp. Sta. Bull. 348. 87-110. 1922.—Pruning retards the growth of olive trees, especially when young. The excessive pruning often practiced on young trees may retard development 90 per cent. Mission olives which receive no pruning during the first 4-5 years develop a more perfect form than pruned trees. The method of handling young Mission olives recommended on the basis of 5 years' experiments hastens development, improves form, promotes early bearing, and saves the whole expense of pruning for 4-5 years. The method is probably applicable to any

varieties of naturally upright habit. The use of stakes and tying may be required during the first 2-3 years with varieties of spreading habit like the Manzanillo and Ascolano. This expense would be offset by the saving in pruning and the improved form of the tree; and the more rapid development would be a net gain.—*A. R. C. Haas*.

2467. BIOLETTI, FREDERIC T. **Supports for vines.** California Agric. Exp. Sta. Circ. 252. 19 p. 1922.—The methods described in this circular are suited to nearly all the varieties and conditions of the grape-growing districts in California. In the 1st method the head-pruned vines require only temporary supports; under most favorable conditions the stake may be removed in 2-4 years. The stakes are joined by fencing wire. The 2nd method is used when weeds make cross-cultivation necessary; here the wire is omitted. The 3rd method is for cane-pruned vines which require permanent supports for the annually renewed fruit canes, and consists of a trellis made of pickets and 2 wires. The 4th method is a modification of the 3rd. Directions are given in regard to the heights of stakes and wires, the number of wires, the time of placing supports, support alignment, and the length of trellises, together with kinds and cost of materials and the labor costs.—*A. R. C. Haas*.

2468. BIOLETTI, FREDERIC T. **Vineyard plans.** California Agric. Exp. Sta. Circ. 253. 12 p. 1922.—Directions are given covering the planting and irrigation of vineyards.—*A. R. C. Haas*.

2469. DARNELL-SMITH, G. P. **The effect of blood manures on citrus.** Agric. Gaz. New South Wales 33: 823. 1922.—It is not evident from experiments that injurious results follow application of blood manures to citrus fruits other than are brought about purely by the excessive application of nitrogen contained in the fertilizer. Blood manures did not increase die-back.—*L. R. Waldron*.

2470. DEARING, CHAS. **Grape growing in Florida.** Proc. Florida State Hort. Soc. 35: 121-126. 1922.—The European grape (*Vitis vinifera*) is of little importance in Florida and commercial plantings are not recommended. In northern Florida the Muscadine grape is promising as a commercial venture.—*J. C. Th. Uphof*.

2471. KOCH, RICHARD. **Die Einführung der helländischen versteigerung in Straelen, Crefeld, Schierstein, Ocholt usw.** [The introduction of Dutch auctioning in Straelen, Crefeld Schierstein, Ocholt, etc.] Gartenwelt 26: 509-511. 1 fig. 1922.—It is emphasized that Dutch auctioning of fruits and vegetables should be introduced into Germany. The electric selling apparatus as generally used in Holland and in a few places in Germany is described and its good points discussed.—*J. C. Th. Uphof*.

2472. KURT, MEYMUND. **Unsere Baumschulen, ihr rascher Aufstieg und ihr heutige Bedeutung.** [Our nurseries, their rapid development and present significance.] Gartenwelt 26: 457-459. 1922.—A general description is given of the development and importance of German nurseries where trees and shrubs are grown. In 1870-71 the only firms of importance were those in France, Belgium, and Holland. German nurserymen who had worked abroad adapted the foreign methods to their conditions and at present there are 1,600-1,800 such nurseries in Germany with about 15,000 persons employed.—*J. C. Th. Uphof*.

2473. LEONARD, GEORGE V. **Grove factors influencing citrus fruit quality.** Proc. Florida State Hort. Soc. 35: 21-24. 1922.—Oranges are grown in all sections of Florida but the rather heavy, stony soils give the best quality of fruit. The sour orange [*Citrus aurantium*] is preferred as a root stock for most conditions, but on the ridge land of the lower East Coast in Polk County, the Rough lemon stock gave good results. There was an indication that the fruit dried out at the stem end when Valencias were budded on lemon stock. Varieties, tillage, fertilizers, spraying, and pruning are also discussed.—*J. C. Th. Uphof*.

2474. LIEMS, J. A. **De Sinaasappelcultuur.** [Orange growing.] *West-Indië* 7: 3-11. 1922.—In Surinam, of all tropical fruits, the orange is best suited for export. It ripens July-Oct. when no other oranges are on the European markets. Sand is better than clay for its culture. Lime [*Citrus aurantifolia*] and lemon seedlings are recommended for stocks. The following varieties are recommended: Groningen, a native variety, Washington Naval, and Lambs Summer. Some good native sorts are also worthy of further observation.—*J. C. Th. Uphof.*

2475. LIEMS, J. A. **Proefneming met sinaasappel op lemmetje onderstam.** [Experiments of oranges on lime stock.] *West Indië* 7: 12-14. 1922.—On account of the warm, moist climate the humus supply soon disappears from the highland soils after timber is removed. On such soils the lime [*Citrus aurantifolia*] has proved a better stock for orange than orange seedlings.—*J. C. Th. Uphof.*

2476. MILSUM, J. N. **The Brazil-nut in Malaya.** *Malayan Agric. Jour.* 10: 87-88. 1922.—At Kuala Lumpur the Brazil-nut (*Bertholletia*) has set fruit when 9 years old. Propagation by cuttings and layers has not been found possible.—*I. H. Burkill.*

2477. MORLEY, JOHN. **Avocados on high pine land.** *Proc. Florida State Hort. Soc.* 35: 42-45. 1922.—It was observed that on high pine land the avocado trees developed more short fruiting branches than those grown on muck soils. Planting and fertilizing are discussed. Careful shading was adopted and frequent watering of the grove practiced. Mulching was followed at first but later abandoned for cultivation. The varieties grown are Trapp and Pollock.—*J. C. Th. Uphof.*

2478. POPENOE, WILSON. **Avocado explorations in tropical America.** *Proc. Florida State Hort. Soc.* 34: 31-36. 1922.—This article describes the 3rd avocado expedition to South and Central America. A wild form was discovered on the slopes of the Irazu volcano in Costa Rica which may be the prototype of the cultivated varieties of West India and Guatemala. It may prove to be of value as a stock on which to work some of the more delicate varieties and for use in breeding. The wild avocado (*aguacate de anís*) grows in small ravines and on moist slopes at an elevation of 400-600 feet. The wild avocados of Santa Marta, Columbia, are of the West India race and have escaped from cultivation. Some valuable cultivated varieties of the Mexican race were found in Ibarra, northern Ecuador. They are larger than any variety in Mexico or California and came from the valley of the Rio Chora where several thousand avocado trees are grown. The most promising variety introduced into the U. S. A. weighs 18 ounces, has small seeds, and flesh free from fiber. It was named for an Ecuadoran Tamayo. [See also *Bot. Absts.* 11, Entry 4026].—*J. C. Th. Uphof.*

2479. SANDS, W. N. **The cinchona (quinine) industry in Java.** *Malayan Agric. Jour.* 10: 65-86. 1922.—A report upon the various phases of cinchona cultivation in Java is presented.—*I. H. Burkill.*

2480. SAX, KARL, AND JOHN W. GOWEN. **The relation of tree type to productivity in the apple.** *Maine Agric. Exp. Sta. Bull.* 305. 20 p., 4 fig. 1922.—In 1 Ben Davis orchard of 881 trees, productiveness is associated with large size and great number of laterals while unproductiveness is associated with small size and upright spurless branches. Differences in productivity are attributed to differences in soil and root stocks rather than to scions. It is recommended that root stocks for new orchards be from rapidly growing 1-year old stock.—*Donald Folsom.*

2481. STODDART, J. **Grading and sizing of apples.** *Jour. Ministry Agric. Great Britain* 29: 543-545. 1922.—An improved type of handsizer for apples is described and illustrated.—*M. B. McKay.*

2482. TUFTS, WARREN P., AND GUY L. PHILIP. **Almond pollination.** California Agric. Exp. Sta. Bull. 346. 3-35. 1922.—Almond varieties may be roughly divided into 2 classes, early bloomers and late bloomers, when the length of effective full bloom is considered. The 1st blossoms produced by most almond varieties yield a smaller amount of pollen, which is also inferior in viability to that produced by flowers on the same tree maturing several days or a week later. Pollinizing agencies, such as the honey bee, are necessary to the set of a good crop of fruit. One colony of honey bees should be provided for each acre of orchard. All almond varieties thus far tested have proved self-sterile, at least in certain years. The I. X. L. and Nonpareil varieties proved practically inter-sterile during 3 seasons' work. The Languedoc and Texas proved practically inter-sterile in 1917 and 1919. The California, disregarding its own commercial value, seems to be the best pollinizer for all varieties thus far tested which have a coincident period of bloom. Data on successful inter-varietal pollinations are given for many varieties. Care should be taken in the arrangement of varieties in the orchard to facilitate cross-pollination and convenience in harvesting.—A. R. C. Haas.

2483. VAILE, R. S. **Fertilizer experiments with citrus trees.** California Agric. Exp. Sta. Bull. 345. 466-512. 1922.—There is a positive value to be derived from fertilizing citrus trees on any of the soils involved in these trials, as measured by increased crop yields. The chief response is obtained from nitrogen, none following the use of potash or phosphoric acid in any of the trials reported, either when used alone or in conjunction with nitrogen. Lime, applied as ground limestone, has not been of value in the trials reported except at Chula Vista on the Kimball sandy loam soil. Bulky organic material has been of importance in citrus fertilization. Specific fertilizing materials have given different results in different locations, so much so that findings from one set of field trials should not be too literally interpreted for any other set of conditions. Field trials and orchard surveys indicate clearly that fertilization is required for the economical production of citrus fruits under usual southern California conditions. It appears that fertilizing is often delayed too long after planting and that larger applications might be used with profit. Neglected groves may be improved by the use of nitrogenous fertilizers. Typical mottle leaf and attendant characteristics are not improved by the use of commercial fertilizers, particularly inorganic forms. Covering the ground with straw mulch, thus eliminating the necessity for tillage, improves run-down citrus groves. This method of culture is likely to be limited in effectiveness to a period of 2-3 years, following which ordinary tillage should again be resorted to. The use of green-manure crops in winter has been followed by conflicting results in the different trials.—A. R. C. Haas.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

2484. ANONYMOUS. **A national arboretum and garden in Washington.** Wild Flower Preservation Soc. [Washington, D. C.] Circ. 5. 4 p. 1923.—This circular sets forth the desirability of securing a tract of 800, which in the future could be increased to 2000, acres along the Anacostia River at the northerly end of Maryland avenue, 2 miles from the Capitol. This tract of land would be used as a site for a national arboretum and the Washington Botanical Garden would be moved there from its present location.—C. G. Vinson.

2485. BENEDICT, R. C. **Ferns as house plants.** Amer. Fern Jour. 12: 77-92. Pl. 5-7. 1922.—The author discusses the care of ferns in the home and the best kinds for that use. The "florist divides cultivated plants" into "four classes according to temperature requirements,"—"hardy," "semi-hardy," "greenhouse," and "stove." The semi-hardy or greenhouse types are the only ones suited for house use. Five semi-hardy and 24 sub-tropical varieties are described and most of them are illustrated by photographs.—F. C. Anderson.

2486. BLITTERA, NIKOLAUS. **Beiträge zum Anbau und Auslese des Mohns.** [Investigations in cultivation and selection of poppies.] Wien. Landw. Zeitg. 72: 44-45. 1922.—Planting distance, both as between plants and rows, influences the number of capsules borne per plant, the ratio of seed weight to capsule weight, and to some extent the form of capsule. The most suitable planting distance varies among different strains. Normal capsule shape is spherical

or somewhat oblate; in cultivation pear-shaped capsules also appear. The latter show the most favorable proportion of seed weight to capsule weight and selection should seek to preserve this form. Capsules of average size rather than the largest ones show the highest seed weight in proportion to weight of capsule. Similarly capsules of light color—brown or yellowish—have a higher proportionate seed weight than the violet brown ones.—Precocious germination of seed within the capsule sometimes occurs during prolonged rainy weather. Violet-brown capsules show the most rapid water absorption and most tenacious retention, hence premature germination occurs most frequently in capsules of this color. Capsules of average size, pyriform in shape and light brown in color, should be selected.—*F. Weiss.*

2487. CLARKSON, EDWARD H. **Experiments in naturalizing ferns.** *Amer. Fern Jour.* 12: 19-22. 1922.—The article describes the transplanting of several species of ferns, giving situations where planted and results after 6 years. In most cases the ferns have done well.—*F. C. Anderson.*

2488. LOBNER, M. **Pfitzers Gladiolen Neuheiten.** [Pfitzer's gladiola novelties.] *Möllers Deutsch. Gärt. Zeitg.* 37: 256. 1922.—Herbstzauber flowers late and develops very large, salmon-red flowers. This variety is promising. *Weisser Samling* (No. 12,498), or *Magnolia*, has a growth similar to the former sort with pure white flowers.—*J. C. Th. Uphof.*

2489. UPHOF, J. C. TH. **Das Aushöhlen der Zwiebeln bei der Vermehrung der Hyazinthen.** [Scooping of bulbs in the propagation of hyacinths.] *Möller's Deutsch. Gärt. Zeitg.* 37: 277-278. 1 fig. 1922.—This procedure is practiced in Holland, a special knife being used. Depending on the variety, the axis of the bulb is scooped out to as near the scales as possible or a cross is cut out, the bulbs being then placed upside down in boxes. The wounds are disinfected with a solution of mercuric chloride or with lime, although the latter is less effective. Later the bulbs are laid on wooden ridges in the dark at a temperature of 15-20°C. in rooms constructed for the purpose. They remain in this situation until about 2 weeks before planting, when they are slowly accustomed to daylight. They are then (Oct.-Dec.) planted upside down in the field and during the summer young bulbs develop in the old ones. The crop is harvested in July and the young bulbs replanted the following autumn, flowering in the 2nd or 3rd year.—*J. C. Th. Uphof.*

VEGETABLE CULTURE

2490. GEISE, FRED W. **Storing and bedding sweet potato stock.** *Virginia Truck Exp. Sta. Bull.* 39/40. 223-234. 1922.—The author discusses principles involved and methods of handling in the field and storage to obtain the highest quality sweet potato seed stock. Harvesting, selection, storage, disinfection, beds, bedding, and care of the beds are given consideration.—*H. A. Jones.*

2491. KREUZPOINTER, J. **Asparagus zur Schnittgrüengewinnung.** [Asparagus for cutting bouquet-green.] *Möller's Deutsch. Gärt. Zeitg.* 37: 253-254. 1922.—*Asparagus retroflexus arboreus* and *A. Sieberianus* are recommended for use in bouquets. The latter can be propagated from cuttings, 30-40 per cent rooting when taken in spring or summer.—*J. C. Th. Uphof.*

2492. MAGOON, C. A., AND C. W. CULPEPPER. **A study of sweet-potato varieties, with special reference to their canning qualities.** *U. S. Dept. Agric. Bull.* 1041. 34 p., 3 pl. 1922.—Forty-four varieties of sweet potatoes, here described in some detail and illustrated by color plates, were tested for canning qualities. At Arlington, Virginia, Gold Skin ranked 1st for quality of product for 2 seasons. Yellow Jersey, Early Red Carolina, and Big Stem Jersey represent the best of the dry firm types; Dooley, Porto Rico, Nancy Hall, Mullihan, and Vineless Pumpkin "yam" are good varieties of the deep colored group; and the Belmont, Miles, and Yellow Strasburg are good varieties of the lighter fleshed medium-moist type. Qualities to be considered in canning are discussed for the various varieties, also the changes after digging and the chemical changes of the product. Effect of oxygen on product, temperatures

for canning, time required, etc., are given. Potatoes which are firm after cooking contain high percentage of starch, while those which become soft have a high percentage of dextrin and low percentage of starch. Changes in plasticity are due to transformations affecting ratio of starch to moisture.—*J. T. Buchholz.*

2493. NICOLAISEN, N. *Unsere Gemüsebauversuchsfelder.* [Experimental fields for vegetables.] *Gartenwelt* 26: 520–521. 3 fig. 1922.—This article outlines experimental work with vegetable crops. The types of investigations and functions stressed are: (1) adaptation of vegetables for certain uses; (2) distance for planting and best kinds of culture, proper amount of seed per unit of area, secondary crops, comparative use of machinery and hand labor; (3) fertilizer experiments; (4) studies of fungicides and insecticides; (5) testing of novelties; (6) encouragement of vegetable forcing; (7) stimulation of the use of vegetables by conducting courses in cooking; (8) acquaintance with the needs of the trade; (9) dissemination of information.—*J. C. Th. Uphof.*

2494. SMITH, LOREN B., AND H. H. ZIMMERLEY. *Booms for spraying truck crops.* Virginia Truck Exp. Sta. Bull. 28. 83–98. 1919.—A description is given of booms best adapted to the spraying of potatoes, tomatoes, spinach, and kale. Lists of materials used in the construction of the various booms are included.—*H. A. Jones.*

2495. ZIMMERLEY, H. H., AND LOREN B. SMITH. *A study of the cost of spraying kale.* Virginia Truck Exp. Sta. Bull. 30. 121–134. 1920.—The yearly production of kale in Eastern Virginia is 368,460 barrels. For the control of cabbage worms and cabbage loopers attacking this crop, the authors recommend the use of powdered lead arsenate at the rate of 1½ pounds to 50 gallons of water. For the control of aphids, 8¼ ounces nicotine sulphate plus 5 pounds fish-oil soap to 50 gallons of water is recommended. The total cost of spraying with the lead arsenate solution when spray machine moved at the rate of 3½ miles per hour with rows 20, 24, 30, and 36 inches apart was \$1.77, \$1.47, \$1.18, and \$1.14 per acre respectively. The total cost of spraying for aphids with the nicotine sulphate and fish-oil soap solution, spray machine moving at 3½ miles an hour and the rows 20, 24, 30, and 36 inches apart, was \$3.46, \$2.89, \$2.31, and \$2.04 per acre respectively. A 2-wheel sprayer, equipped with triplex pump and gasoline engine was used. Booms, etc., used are described in bulletin 28 [see preceding entry].—*H. A. Jones.*

2496. ZIMMERLEY H. H., FRED W. GEISE, AND C. R. WILLEY. *Dusting vegetable crops.* Virginia Truck Exp. Sta. Bull. 35/36. 193–208. 1921.—This is a discussion of results obtained during 1921 at the Virginia Truck Experiment Station on dusting for insect and disease control. "In the laboratory the 3 per cent nicotine dust proved the most effective in the control of 4 species of aphids. Based on an average of the 4 species the 1, 2, and 3 per cent nicotine-impregnated dusts killed 72.2, 82.1, and 89.3 per cent, respectively. For the control of aphids (*Myzus persicae* and *Macrosiphum solanifolii*) on spinach, a hydrated lime carrier with 2 per cent nicotine-impregnated dust proved the most economical. The quantity necessary varied from 20 to 40 pounds per acre. For the control of the Colorado potato beetle (*Leptinotarsa decemlineata* Say) a dust mixture containing at least 20 per cent calcium arsenate is recommended. In the control of the cabbage looper (*Autographa brassicae* Riley) and the imported cabbage worm (*Pontia rapae* Sch) on kale and Brussels Sprouts, both Noburn and a 50 per cent calcium arsenate dust gave equally good control. The action of the Noburn was more rapid than that of the calcium arsenate."—*H. A. Jones.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 2247, 2338, 2374, 2438, 2486, 2489, 2558, 2586, 2628, 2642, 2746, 2769, 2801, 2803, 2848, 2865, 2873, 2883)

2497. BROWNE, ISABEL M. P. *Anatomy of Equisetum giganteum*. Bot. Gaz. 73: 447-468. Fig. 1-7. 1922.—The node of the young main stem, nodes of smaller fertile branches, branches initiated on the main stem, and young internodes of main stem were studied. The direction of differentiation of the metaxylem in the internode is mainly centripetal. The outer elements are the smallest, and become wider in passing inward. These lateral, internodal strands of xylem join on to the nodal wood, at which level they lose their identity. There is no indication of their persisting as strands external to the nodal wood. The protoxylem is continuous through the node. By the departure of the medianly situated tracheids to the trace the protoxylem is divided into 2 small groups which diverge and enter neighboring but separate bundles of the internode above. Each of these small strands fuses with an equivalent strand of protoxylem derived from the adjacent bundle of the internode below. The fusion is effected partly by a sudden increase in number of the protoxylem elements. The nodal wood attains a considerable height and radial depth. Wide reticulate, typically nodal tracheids appear below and persist for some distance above the departure of the traces. The protoxylem elements are situated at the interior of the xylem, and pass through the inner part of the metaxylem of the bundle in a kind of parenchymatous sheath, 2 or 4 cells in thickness. The continuity of the protoxylem of the internodes through the nodes, which, although not characteristic of all species, is not confined to *E. giganteum*, is a primitive character within the genus. The question as to whether the lateral metaxylem of the genus was primitively centripetal, as in *E. giganteum*, or primitively centrifugal, as in the other species the detailed anatomy of which is known, is left open.—B. W. Wells.

2498. BUGNON, P. *Sur la ramification dichotome dans les cotylédons*. [On the dichotomous branching of cotyledons and their veins.] Compt. Rend. Acad. Sci. Paris 174: 1194-1196. 6 fig. 1922.—From this study of *Mercurialis*, *Eschscholtzia*, and *Raphanus* to determine their ancestral characters, the author believes a cotyledon character to be ancestral if it appears during embryonic development; if it does not seem to constitute a special adaptation of the cotyledon, if it does not appear in the vegetative leaves of the same plant; or if it was present in the adult leaves of ancestral plants.—C. H. Farr.

2499. BUGNON, P. *Sur l'hypocotyle de la Mercurialis*. [On the hypocotyl of *Mercurialis*.] Compt. Rend. Acad. Sci. Paris 174: 954-957. Fig. 1-2. 1922.—The conductive apparatus in the embryo of *Mercurialis annua* was studied. There is a longitudinal intercalary growth in the hypocotyl and at the base of the cotyledons, which explains the transitory character of the primary vessels which develop there. These facts are discussed in their bearing on the theory of seedling development put forward by Chauveaud.—C. H. Farr.

2500. CAMPBELL, DOUGLAS H. *The gametophyte and embryo of Botrychium simplex Hitchcock*. Ann. Botany 36: 441-456. Pl. 16, 10 fig. 1922.—The gametophyte and embryo of this species, the smallest of the genus, are described in detail and compared with those of the other species. The gametophyte closely resembles that of *B. lunaria*, differing chiefly in the smaller development of rhizoids and less conspicuous endophytic fungus. The embryo also resembles that of *B. lunaria*, but differs in the following points: the early divisions are much more variable and irregular, in this respect resembling those of *B. virginianum*; the apical bud is much better developed; the apical cell of the stem is not tetrahedral but has a truncate base like that of *B. obliquum*; and the cotyledon is much more important. The vascular system of the young sporophyte is made up exclusively of steles belonging to the roots and leaves.—W. P. Thompson.

2501. COOKSON, ISABEL C. **Floral abnormalities in the genera *Eriostemon* and *Glossodia*.** Proc. Roy. Soc. Victoria 33: 32-38. 1 pl., 4 fig. 1921.—Four abnormal plants of *Eriostemon obovalis* Cunn. are described. The abnormal flowers had petals of normal color, but a small outgrowth containing pollen occurred on the ventral surface of many of them. The tip of the lamina was generally incurved, forming a hood around the anther. Other floral characters were normal. An extreme type of abnormality was observed less often in which the lamina of the petal is modified to form a somewhat stamen-like filamentous structure with a small expanded distal portion on which a more complex anther was placed. The structure of petal and another from unopened buds is described in detail and was found to vary somewhat.—Three plants of *Glossodia major* R. Br. possessed 2 labella and abnormal perianth segment arrangement. One showed 6 perianth segments, the 3 outer calyx lobes being similar to the 2 lateral corolla lobes in size, shape, and color. The median anterior petal formed a lip. Another specimen had a median flat petal indistinguishable from the laterals and had also 2 lips, the position of which suggested that they were due to the modification of 2 missing stamens. In a 3rd specimen the median lip was replaced by a flat petal which had fused with 2 lateral sepals to form a compound lobe.—*Eloise Gerry*.

2502. DUPLER, A. W. **A bisporangiate sporophyll of *Lycopodium lucidulum*.** Bot. Gaz. 74: 331-332. 1 fig. 1922.—An instance of 2 small sporangia appearing at the base of a single sporophyll is reported. The writer suggests as explanations the very early sterilization of the archesporial tissue or the appearance of 2 distinct groups of initials.—*B. W. Wells*.

2503. ENGLER, A. **Beiträge zur Flora von Afrika XLIX. Ueber die eigenartigen Blütenverhältnisse der Gattung *Endodesmia* Benth.** [Contributions to the flora of Africa XLIX. On the peculiar floral conditions in the genus *Endodesmia*.] Bot. Jahrb. 57: 645-648. 1 fig. 1922.—The author describes the occurrence of stamens in bundles, stating that in the Guttiferae the bundles arose by fusion, not by fission as is generally supposed. The peculiar swollen receptacle beneath the ovary of the normal flowers is described, also certain abnormal flowers probably produced by gall insects. In the abnormal flowers the stamens are separate and the receptacle is enlarged above, not below, the sepals.—*K. M. Wiegand*.

2504. GORDON, MARY. **The development of endosperm in cereals.** Proc. Roy. Soc. Victoria 34: 105-116. Fig. 1-9. 1922.—The development of the aleurone layer and the starchy endosperm was traced in barley, wheat, and oat ovules and found to be practically identical in the 3. The first endosperm cells are derived from the secondary nucleus of the embryo-sac. Nuclei pass to walls of the embryo-sac, form a lining layer, and became enclosed by cell walls. The single layer of lining cells assumes the character of a cambium and produces segment cells on its inner surface. These enlarge, remain thin-walled, become packed with starch, and form the starchy endosperm. After the cells of the endospermic cambium cease to divide they become filled with aleurone grains and the cell walls thicken; this is then the aleurone layer. Its greater respiratory activity and the presence of vitamins in it are the natural results of its being a resting cambium.—*Eloise Gerry*.

2505. JUNGE, HEINRICH. **Eigenartige Blüentriebe eines *Asparagus Sprengeri*.** [Peculiar flowering-stalk of *Asparagus Sprengeri*.] Möllers Deutsch. Gärt. Zeitg. 37: 253. 1 fig. 1922.—A 4-year-old well-developed plant produced from its center 6 entirely leafless upright flowering stems, though some of the normal overhanging leafy stems also formed flowers.—*J. C. Th. Uphof*.

2506. JURICA, HILARY STANISLAUS. **A morphological study of the Umbelliferae.** Bot. Gaz. 74: 292-307. Pl. 13-14. 1922.—This paper, which brings together the morphological studies on the Umbelliferae (84 references cited), deals with the embryo-sac development and stages subsequent thereto in *Sium cicutaefolium* and *Eryngium yuccifolium*. After taking all characters into consideration, the writer states: "The complete cyclic arrangement of floral members associated with definite numbers, the single integument, the anatropous ovule, the

absence of parietal tissue of the megasporangium, the small nucellus, and the complete tetrad of the megaspores of the Umbelliferae, all of which are general characters of the Sympetalae in contrast to those of the Archichlamydeae, from which the Umbelliferae stand so stiffly apart, prove that the Umbellales in reality belong among the Sympetalae." Within the latter group the writer believes they should be placed parallel to the Rubiales in such manner as to indicate a common origin for both groups.—*B. W. Wells.*

2507. NICOLAS, G. Des synanthies, à propos du *Narcissus Tazetta* L. [On synanthly, especially in *Narcissus Tazetta*.] *Compt. Rend. Acad. Sci. Paris* 174: 1126–1128. 1922.—This instance of teratology is carefully described and used as confirmation of the ligular theory of the crown of the *Narcissus* blossom. It is concluded that all cases of synanthly, syncarpy, and fasciation, and all anomalous characteristics of non-dissociation and of concrescence of buds, are not due to an excess of nutrition, but to deficient nutrition.—*C. H. Farr.*

2508. NISHIMURA, MAKOTO. Comparative morphology and development of *Poa pratensis*, *Phelum pratense* and *Setaria italica*. *Japanese Jour. Bot.* 1: 55–85. 4 pl., 53 fig. 1922.—Germination and the development of root and shoot, inflorescence and embryo were studied. Marked differences were noted in rate and percentage of germination, *Setaria* exceeding the others in both. The characteristic hairs developed at the tip of the coleorhiza are described. *Poa* and *Phleum* (both perennials) develop compact stools the 1st season but *Setaria* (an annual) forms only a single leafy culm. In the 2nd season each shoot of *Phleum* produces a stout, corm-like body which is lacking in *Poa*. Plants sown from seed at different dates during the growing season differ markedly in many features. Development of the root system was studied and various differences noted between the 3 genera; all are shallow rooted, and 2 roots are usually associated with each bud. The root-hair zone frequently extends over the whole root and the hairs may last into the 2nd season. The inflorescence is developed in all cases from a vegetative cone through the production of a series of lateral, spike-forming primordia. The embryo develops normally but polyembryony occurs somewhat commonly in *Poa*. Abnormal ovaries frequently appear following the stings of an insect.—*E. W. Sinnott.*

2509. OELKERS, FRIEDRICH. Entwicklungsgeschichte von *Monophyllaea Horsfieldii*. [Development of *Monophyllaea Horsfieldii*.] *Beih. Bot. Centralbl.* I Abt. 39: 128–151. Pl. 15, 12 fig. 1922.—The seed germinates in 14–21 days after ripening. The young seedling shows 2 equal cotyledons which later become unequal. The root develops exogenously from the end of the hypocotyl, but the lateral roots develop endogenously. The development of the inflorescence and ovules is described. The egg and synergids are as usual, but it was not determined whether antipodals are present or whether the polars fuse. Pollen development is normal. The diploid chromosome number is 32. Double fertilization takes place. The young undifferentiated embryo has a large haustorium; later 2 equal cotyledons develop.—*L. Pace.*

2510. PAMMEL, L. H., AND C. M. KING. The germination of some trees and shrubs and their juvenile forms. *Proc. Iowa Acad. Sci.* 27: 75–80. [Fig. 10–11. 1920.—] Figures and descriptions are given of the seedlings (cotyledons and first leaves) of *Populus deltoides*, *Ulmus racemosa*, *Berberis macroacantha*, *B. laxiflora oblanceolata*, *Citrus decumana*, *Ampelopsis heterophylla*, *Ptelea trifoliata*, *Nyssa sylvatica*, *Diospyros virginiana*, and *Fraxinus americana*.—*H. S. Conard.*

2511. POHL, FRANZ. Zur Kenntnis unserer Beerenfrüchte. [Our berry-fruits.] *Beih. Bot. Centralbl.* I Abt. 39: 206–221. 1922.—The fruits of several species of *Ribes* are described in some detail. The development of berry-fruits from the arillus is rare. *Taxus* and *Podocarpus* have fleshy arilli, as does the cactus. The fruit of *Garcinia* is developed largely from the arillus, but the origin of that of *Podophyllum* needs further investigation. *Ribes* shows considerable variation in the relative amount of the fruit coming from the arillus. This structure produces the greater part of the berry in *R. nigrum*, *R. aureum*, and *R. alpinum*, but

the pericarp forms the greater part in *R. rubrum*, *R. gracile*, and *R. canescens*. In the large pericarp berry of *R. grossularia* the arillus is much reduced. It is not easy to decide whether the pericarp or the arillus type of berry is the older.—*L. Pace*.

2512. PRINTZ, H. Det vegetative skuds anatomiske bygning hos *Phelipaea lanuginosa*. C. A. Meyer. [The anatomy of the vegetative sprout in *Phelipaea lanuginosa*.] K. Norske Videnskab. Selskab. Skrifter 1921: 1-49. Pl. 1-4, fig. 1-31. 1922.—The external features of *Phelipaea lanuginosa* are typical of the *Orobanchaceae*. The morphological features of this species are here discussed. Surrounding the vascular bundles a sclerenchymatic sheath is often developed which is very different in different individuals, and in the opinion of the author is an adaptional phenomenon and can not be used for specific distinctions as previously supposed. The stomata are numerous for a parasitic plant, and their position is also remarkable. In some, the guard-cells lie at the same level as the epidermis, but in others they are elevated high above the cells of the epidermis. The 2 kinds may occur together, and it is probable that they serve different purposes. Starch is found in the guard-cells, but chlorophyll is absent throughout the whole plant. The trichomes are different from those previously described for the family, as they are composed of a row of long, cylindrical, thin-walled living cells. The cells of the epidermis, and often also of the outer layers of the bark, are destroyed rather early and form a very effective obstacle to transpiration. The veins are collateral and in this respect differ from other related plants in which the veins are reported to be hadrocentric. The short and vermiform roots possess little or no geotropical sensitiveness. Two roots are occasionally connected by means of haustoria, which are anatomically similar to those which unite the plant with its host. There is also a tendency toward reciprocal accretion between the roots, but in this case only epidermis and bark are united. These 2 phenomena are probably due to the same cause, probably a kind of contact stimulation. [A German résumé is appended.]-*K. Münster Ström*.

2513. SCHMIDT, E., UND E. GRAUMANN. Zur Kenntnis pflanzlicher Inkrusten. I. Mitteilung: Methode zur Reindarstellung pflanzlicher Skelettsubstanzen. [Contributions to our knowledge of plant incrustations. I. Methods for the purification of skeletal plant substances.] Ber. Deutsch. Chem. Ges. 54: 1860-1873. 1921.—A method is presented by means of which the skeletal substance (cellulose) of plants can be separated from incrustations (e.g., lignin).—*Henry Schmitz*.

2514. SEARS, PAUL BIGELOW. Variation in cytology and gross morphology of *Taraxacum*. II. Senescence, rejuvenescence and leaf variation in *Taraxacum*. Bot. Gaz. 73: 425-446. Fig. 1-9. 1922.—The author believes that variations arising from senescence and from ecological causes constitute characters which have often been used in creating species. He shows that "while bracts and achenes are conceded to afford critical characters, the leaves are actually given great weight in spite of their variability." In inducing leaf variations senescent and rejuvenescent changes are prime factors. "Senescence produces a steadily increasing degree of dissection and frequently of hairiness; rejuvenescence restores the unsegmented juvenile seedling form." Changes toward senescence are not correlated with absolute leaf area, total xylem duct capacity in successive leaves, mean xylem duct capacity in successive leaves, ratio of total capacity to leaf area, or number of vein islets per unit area. A definite increase of the carbohydrate-nitrogen ratio is related to senescence. "The time of seeding may govern time of flowering and rejuvenation: this in turn may affect degree of dissection in plants at flowering time." Thus "pure stands of distinctive variants in certain cases may be explained by environmental control of seed germination time." Fluctuations in plant parts other than the leaves are in many cases due to ontogenetical and environmental conditions, but for the most part to unknown causes. It is held that a considerable number of published species are merely variants of *T. vulgare* and *T. laevigatum* caused by the interplay of the various factors operating in senescent change and in the environment.—*B. W. Wells*.

2515. SINNOTT, E. W., AND I. W. BAILEY. The significance of the 'foliar ray' in the evolution of herbaceous angiosperms. *Ann. Botany* 36: 523-534. *Pl. 18-19, 1 fig.* 1922.—The authors had previously expressed the opinions that the chief anatomical concomitant of the change from the woody to the herbaceous habit is simply a progressive thinning of the woody ring, that herbaceous stems are essentially similar in structure to their woody ancestors, and that the woody ring of many-bundled herbs is dissected by high multiseriate rays which are not subtended by woody elements. These conclusions have been attacked by Jeffrey and Torrey, who hold that a new structure, the foliar ray, subtended by woody elements (traces) has made its appearance in the evolution of woody herbs from trees or shrubs and that these woody or transitional herbs have given rise in turn to more herbaceous types by the loss of the confronting portion of the ray and a downward extension of its flanking portions. After clearing up certain misapprehensions and reaffirming the correctness of their original observations, the authors present evidence to show that (1) the 'foliar rays' include several distinct structures, (2) many trees possess foliar rays and are therefore in the first annual ring precisely comparable to herbs, and (3) many herbs have no foliar rays but a continuous vascular cylinder. They conclude that their critics' hypothesis is not tenable because (1) it cannot explain the origin of herbs with continuous cylinders and (2) it involves the evolution and subsequent loss of a transitional structure when the facts are more easily and simply explained without such an assumption.—*W. P. Thompson.*

2516. SOUEGES, RENÉ. Embryogénie des Rosacées. Les premiers stades du développement de l'embryon chez le *Geum urbanum* L. [Embryogeny of the Rosaceae. The first stages in the development of the embryo of *Geum urbanum*.] *Compt. Rend. Acad. Sci. Paris* 174: 1070-1072. *Fig. 1-15.* 1922.—A detailed description and figures are given of the stages in development of this species. Some points of similarity are found between its embryogeny and that of *Capsella Bursa-pastoris*. [See also following entry].—*C. H. Farr.*

2517. SOUEGES, RENÉ. Embryogénie des Rosacées. Les derniers stades du développement de l'embryon chez le *Geum urbanum* L. [Embryogeny of the Rosaceae. The later stages of development of the embryo of *Geum urbanum*.] *Compt. Rend. Acad. Sci. Paris* 174: 1197-1199. 1922.—A new type of embryo development akin to that of *Myosotis hispida* is reported. [See also preceding entry].—*C. H. Farr.*

2518. THODAY, D. On the organization of growth and differentiation in the stem of the sunflower. *Ann. Botany* 36: 489-510. *Pl. 17, 10 fig.* 1922.—In the primary leaf-trace bundles the whole of the xylem originates from a cambium which arises near the inner margin of the procambial crescent. The bulk of the crescent differentiates as phloem. New bundles are interpolated between the primary ones. The transverse growth of a leaf-trace is correlated with that of its leaf and not that of the internode as a whole. Though the xylem portions of the entering leaf-traces remain independent, the strands of the phloem which accompany them connect laterally with those of adjacent bundles, thus making a shorter circuit for the movement of food. Secondary growth is at first due to the cambium of "synthetic traces" which communicate directly with the expanding upper leaves. This growth is in large part tangential, so that the pith becomes distended and often hollow. Meantime the cambium in the mature leaf-trace bundles remains inactive for a considerable time and only gradually resumes growth. The mode of growth is the same in all parts of the stem as in the basal internode. The differences in appearance are due merely to the fact that the upper regions represent an earlier phase in ontogeny, and to the larger scale of the primary tissues in the upper part. Phylogenetic inferences with respect to the origin of herbs as adduced from a comparison of the base with the upper parts are not justified.—*W. P. Thompson.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*L. H. TIFFANY, *Assistant Editor*

(See in this issue Entries 2328, 2329, 2557, 2636, 2637, 2638, 2668, 2671, 2727, 2769, 2783, 2846)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 2320, 2331, 2846)

2519. ANONYMOUS. **Hepatics.** Moss Exchange Club Sec. II Rept. [Bewdley] 1917: 14-18. 1918.—The Hepaticae distributed during 1917 numbered 67 species and included *Prionolobus striatulus*, new to Wales. The specimens were all collected in the British Isles except 8 from Switzerland. In a few instances D. A. J[ONES] has contributed critical remarks.—A. W. Evans.

2520. ANONYMOUS. **Hepatics.** Moss Exchange Club Sec. II Rept. [Bewdley] 1918: 22-25. 1919.—The specimens of hepatics distributed in 1918 include 57 species and were all collected in the British Isles. A few critical notes by D. A. J[ONES] accompany the report.—A. W. Evans.

2521. ANONYMOUS. **Hepatics.** Moss Exchange Club Sec. II Rept. [Bewdley] 1919: 21-27. 1920.—Of the 89 species of hepatics listed in the 1919 distribution, 3 came from Switzerland, 2 from Italy, and the others from the British Isles. D. A. J[ONES] has commented on a few of the specimens.—A. W. Evans.

2522. ANONYMOUS. **Mosses.** Moss Exchange Club Sec. II Rept. [Bewdley] 1917: 8-13. 1918.—The specimens of mosses distributed during 1917 included 76 species: with the exception of 3 from Switzerland, all came from the British Isles. A few critical notes are contributed by D. A. J[ONES], G. B. S[AVERY], W. R. S[HERRIN], and J. A. W[HELDON].—A. W. Evans.

2523. ANONYMOUS. **Mosses.** Moss Exchange Club Sec. II Rept. [Bewdley] 1919: 8-21. 1919.—Of the 176 species of mosses listed in the 1918 distribution, 17 came from Switzerland, 1 each from Bavaria, Canada, Italy, and Salzburg, and the others from the British Isles. The critical notes interpolated throughout the list are by J. AMANN, D. A. J[ONES], G. B. S[AVERY], W. R. S[HERRIN], and J. A. W[HELDON].—A. W. Evans.

2524. ANONYMOUS. **Mosses.** Moss Exchange Club Sec. II Rept. [Bewdley] 1919: 8-20. 1920.—The mosses listed as having been distributed in 1919 include 150 species. Of these 14 were collected in Switzerland, 3 in Italy, 1 each in France, Poland, Salzburg, and Tirol, and the others in the British Isles. Critical notes on certain of the specimens are by E. R[ILSTONE], D. A. J[ONES], G. B. S[AVERY], W. R. S[HERRIN], and J. A. W[HELDON].—A. W. Evans.

2525. ANONYMOUS. **Notes.** Bryologist 25: 93-94. 1922.—There are noted the deaths of Egidio Corti and of Abbé Faurie, the sale of collections from the Zoologische-botanische Gesellschaft of Vienna, and the appearance of fascicle 19 of J. M. Holzinger's *Musei Acrocarpi Boreali-Americani*, with a list of the species included in the fascicle.—E. B. Chamberlain.

2526. BRITTON, ELIZABETH G. **On some mosses from the Blue Mountain of Cuba.** Bryologist 25: 89-90. 1922.—An annotated list of 6 somewhat uncommon mosses from the summit of Pico Turquino, Cuba, is given; 3 of the species are new to the island.—E. B. Chamberlain.

2527. DIXON, H. N. The mosses of the Oxford University expedition to Spitzbergen, 1921. *Bryologist* 25: 86-89. 1922.—This is an annotated list of 18 species and varieties of mosses, 5 of the species representing additions to the known flora of Spitzbergen. There is a summary of previous publications on the Spitzbergen mosses, and descriptive notes on a number of the species are included. *Bryum globosum* Lindb. var. *ruberrimum* from Klaas Billen Bay is proposed as new, and a 3rd locality for *Calliergon sarmentosum* var. *fontinaloides* Berggr. is noted.—E. B. Chamberlain.

2528 DIXON, H. N. Note on a form of *Pottia Heimii* from Greenland. *Bryologist* 25: 92-93. 1922.—The author describes a specimen of the moss *Pottia Heimii* Fuernr. from Ata, Greenland, which shows a combination of characters usually pertaining to distinct varieties of this species. He concludes that the material should be classified as a form approaching var. *obtusifolia* (R. Br.) Hag.—E. B. Chamberlain.

2529. DUNK, KURT VON DEN. Monographie des Leuchtmooses (*Schistostega osmundacea* Web. et Mohr). [Monograph on the luminous moss.] 8vo, 57 p., 4 pl. Inaug. Diss. Frankfurt am Main, 1921.—The author discusses the moss from various points of view, including: taxonomy and history of the species; features of the protonema, including the lens-cells and the gemmae; origin and morphology of the leafy stems; heliotropism of the sterile shoots; branching and production of sexual organs by the fertile shoots; development and structure of the sporophyte; nature of the habitat and geographical distribution; bryophytes usually associated with the species. The following are the more important of the conclusions reached: the significance of the lens-cells has been overestimated; spindle-shaped gemmae represent the only type produced; both the male and female inflorescences can branch, this process being especially frequent in the male inflorescence; the dioecism of the species manifests itself in the leafy shoots only and not in the protonema; moisture and a fairly dim light are necessary for the development of the plants; the species grows on a variety of substrata, preferring sandstone and avoiding lime; and its distribution is in the Temperate Zone of the Northern Hemisphere, its altitudinal range extending from 30 to 1400 m. The plates illustrate morphological and anatomical features.—A. W. Evans.

2530. DUPLER, A. W. Early embryogeny of *Reboulia hemisphaerica*. *Bot. Gaz.* 74: 143-157. 47 fig. 1922.—According to the author's observations the fertilized egg in *Reboulia hemisphaerica* soon gives rise to a filament of 4 cells usually separated by transverse walls. The next divisions are commonly vertical, each cell except the basal forming a tier of 4 cells. Even in the early stages variations frequently occur and the walls may be oblique rather than transverse or vertical; in fact an apical cell cutting off a few segments is sometimes evident in the upper part of the young sporophyte. In all probability the epibasal cell, formed by the 1st division of the egg, gives rise to the capsule only, as in most Marchantiales, while the hypobasal cell gives rise to the stalk and foot. There is no absolute proof, however, that the epibasal cell may not contribute to the stalk region as in the Jungermanniales. Neither is it certain that the 1st periclinal walls in the upper portion cut off the future capsule-wall from sporogenous tissue, although this is probably the case. The author makes frequent allusions to the recent studies of Haupt and Woodburn [see *Bot. Absts.* 4, Entry 1045], as well as to the older literature, and concludes, from the variations in early embryogeny, "that *Reboulia* is a plastic form, and as such may occupy a genetic position among the Hepaticae."—A. W. Evans.

2531. EVANS, ALEXANDER W. Recent studies on certain species of *Riccia*. *Bryologist* 25: 81-86. 1922.—Transitional forms, whose thalli in width and in the structure of the air chambers break down the differences upon which *Ricciella* is maintained as a genus distinct from *Riccia*, make it advisable to consider the 2 groups as but a single genus. The status of the plants called *Riccia fluitans* L. appears to be in doubt. Evidence at present known is conflicting as to whether the plants represent a real species, an aquatic form of a single species, or an aggregate of the aquatic forms of several species. The author summarizes papers by

Torka, Donaghy, von Gaisberg [see Bot. Absts. 11, Entry 464], and Familler [see Bot. Absts. 6, Entry 1207], which detail cultural experiments and field observations upon the question of the relationships between *R. fluitans*, *R. canaliculata*, *R. Huebeneriana*, *R. pseudo-Frostii*, and *R. Sullivantii*, and points out the absence of conclusive data in many cases. There is need for more critical research upon the question and for controlled cultural experiments. The bibliography lists nine titles.—*E. B. Chamberlain*.

2532. FLEISCHER, M. [Rev. of BROTHERUS, V. F. *Musci Weberbaueriani*. (Weberbauer's mosses.) Bot. Jahrb. 56: 1-22. 1920 (see Bot. Absts. 6, Entry 1906).] Hedwigia 63: (Beiblatt) 6. 1922.—The reviewer speaks of the great interest, from the standpoint of plant geography, of the European mosses which the author reports from the Peruvian Andes. Among such species he cites the following: *Bryum bimum*, *Distichium capillaceum*, *Hygroamblystegium filicinum*, and *Splachnum ampullaceum*.—*A. W. Evans*.

2533. HARRIS, G. T. The moss flora of Sidmouth and neighbourhood. Trans. Devonshire Assoc. Adv. Sci. Lit. and Art 50: 561-582. 1918.—The region investigated is mostly comprised within a distance of 5 miles from the town of Sidmouth in East Devon and had previously received less attention than the other parts of Devonshire. The altitudinal range extends from the sea level to a height of over 800 feet. The varied features of the district and the characteristic mosses found in the various kinds of habitat are described in considerable detail, and the paper gives also a "census list of the moss flora," in which 201 species are enumerated, with data regarding frequency and often with the indication of definite stations. In a few cases critical or morphological remarks are added. Six varieties of mosses collected at Dartmoor and representing new county records are reported, 1 being *Hypnum falcatum* Brid. var. *delicatulum* Dixon, described as new.—*A. W. Evans*.

2534. HURST, C. P. North Somerset mosses. Jour. Bot. 56: 268-270. 1918.—The author gives a report on a collection of mosses which he made during the winter of 1916-17 near Burnham-on-Sea, Somerset, England. He enumerates 38 species, varieties, and forms, giving full data regarding localities and, in several cases, including critical remarks. Of the mosses collected 7 represent new vice-comital records.—*A. W. Evans*.

2535. LUISIER, A. Les mousses de Madère (suite). [Madeiran mosses.] Brotéria Sér. Bot. 20: 76-106. 1922.—The present instalment contains keys to the genera and species of the families Polytrichaceae to Brachytheciaceae, with references to the author's earlier articles [see Bot. Absts. 8, Entry 1265; 9, Entry 1507; 10, Entry 1840].—*E. B. Chamberlain*.

2536. THÉRIOT, I. *Leptobryum Escomeli* Thér. sp. nov. Bryologist 25: 90-92. 1922.—The new species of moss here described and figured is from near Arequipa, Peru, and is based on material collected by E. Escomel and R. S. Williams. It is most closely related to *Leptobryum Wilsoni* Broth., figures of which are given for comparison.—*E. B. Chamberlain*.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

D. S. WELCH, *Assistant Editor*

(See also in this issues Entries 2311, 2321, 2322, 2577, 2582, 2584, 2589, 2598, 2611, 2616, 2620, 2668, 2683, 2700, 2750, 2769, 2785, 2844, 2846)

FUNGI

2537. BERGER, E. W. Another apparently new entomogenous fungus from the hammock. Proc. Florida State Hort. Soc. 35: 68-71. 1922.—*Aschersonia basicystis*, an orange-colored fungus, was found in a hammock at Winter Park, Florida. This fungus was collected inde-

pently by C. A. Reese and E. W. Berger, infecting unidentified white fly larvae on *Ilex opaca*. The existence of this fungus on a native fly in Florida is of considerable interest.—*J. C. Th. Uphof*.

2538. CAVADAS, C. S. Étude morphologique, histologique et cytologique d'une mycocécidie provoquée chez l'*Urtica dioica* L. par le *Puccinia Caricis* (Sch.) Rebert. [Aecidia of *Puccinia Caricis* on *Urtica dioica*.] 16 p., 3 pl., 2 fig. Faculté Sci.: Nancy, 1922.—In the pseudoperidium around the aecidiospores of *P. Caricis*, the so-called "sterile cells" of Grove are considered equivalent to the uninucleate cells differentiating from the basal cells at the bottom of the young aecidia. The cells of the pseudoperidium are considered homologous to the aecidiospores. The mycelium has a solvent action on pectic and lignified walls; attacked cells react through hyperplasia or hypertrophy, and their nuclei swell or divide either by mitosis or amitosis.—*J. Dufrenoy*.

2539. DUFF, G. H. Development of the Geoglossaceae. Bot. Gaz. 74: 264-291. Pl. 8-12. 1922.—The author presents the significant stages related to the development of the ascocarp and to sexuality of *Cudonia lutea*, *Spathularia velutipes*, *Trichoglossum hirsutum*, and *Leotia lubrica*. He finds in the Helvellineae a morphological situation involving the veil which finds a parallel in the Baeomyces group of disco-lichens; this is adduced as evidence of relationship. Fructification in *Cudonia* and *Spathularia* is initiated by "generative hyphae" which give rise to the procarps from which the ascogenous hyphae spring. The procarp of *Cudonia* bears a trichogyne, a structure lost in *Spathularia*. Further reduction characterizes the other genera. Progressive reduction of the sex organs has characterized evolutionary progress. In this latter regard also the Geoglossaceae are in close correspondence with the Baeomyces group of disco-lichens.—*B. W. Wells*.

2540. КУРСАНОВ, Л. [KURSSANOW, L.] Морфологические и, цитологические исследования в группе Uridineae. [Morphological and cytological investigations in the Uredineae.] 228 p., 151 fig. Moscow. 1915.—A considerable part of this work consists of the author's studies of the development of the rusts not having aecial forms, 18 species having been investigated. *Uromyces scutellatus*, *U. laevis*, *U. Alchemillae*, *U. Ficariae*, *Puccinia Fergussoni*, *P. suaveolens*, *P. Rossiana*, *P. Aegopodii*, *P. Arthemisiae*, *P. Asarina*, *P. Allii*, *P. Iridis*, *P. Helianthi*, *Triphragmium Ulmariae*, *Chrysomyxa Abietis*, *C. Pirolae*, *Melampsora* sp., *Hyalopsora Polypodii-Dryopteridis*. He discusses in detail the morphological significance of the mutual relationship of the various types of spores in this group and explains their evolution and the questions of sexuality. In the study of the aecial fructification, in addition to the manner of formation of the first binucleate cells, he takes into consideration the time of their appearance, the general structure of the fructification, the formation of the sterile pseudoparenchyma and the relation of the latter to the sterile cells (Blackman's trichogynes). The types of aecial fructification are arranged in a series at one extreme of which is placed *Aecidium* and at the other *Caeoma*. *Aecidium* represents the primitive type, the simpler form of *Caeoma* having resulted through a regressive evolution. An interesting parallelism is observed between the aecia and the primary uredinia and telia in brachy, micro, hemi, and other shortened cycles. The shortened cycles are the more recent, the primary uredinia and telia developing instead of the lost aecial fructification possessed by the primitive forms. The author gives a detailed analysis of the data upon which is based Blackman's theory that the fruiting cells are differentiated female cells. It is shown that the presence of the continuous fruiting layers in the primary fructification cannot be considered as exclusively characteristic of sexual cells. Similar layers are present also in the secondary sori (*Puccinia Helianthi*, *Triphragmium*, etc.). The actions of the nuclei are also not exclusively characteristic of the sexual nuclei. Finally, instability of the sterile cells, dependence of their formation upon outside conditions, their connection with the sterile tissues (*Peridermium*, *Aecidium*), and their presence in the secondary sori (*Triphragmium*, *Puccinia Iridis*, *Melampsoraceae*), oppose the point of view that these sterile cells are atavistic organs of morphological significance. The author considers the sexual process in the present

day Uredineae as a purely apogamic phenomenon to which could be applied the term pseudomixis of Winkler; and he draws a scheme of the evolution of the sexual process which begins with a hypothetical sexual form and ends with a purely apogamic modern aecium. The development of the peridium in different types of aecia is studied. Experiments to demonstrate functioning of the spermatia gave negative results (*Melampsora Rostrupii*). Reduction division was found (*Coleosporium Tussilaginis*) to deviate from the ordinary; that is, in the stage of meta-anaphasis, there are 16 chromosomes.—*S. Satin*.

2541. MARTIN, G. W. The mycoplasm theory. [Rev. of: ERIKSSON, JAKOB. (1) The mycoplasm theory, is it dispensable or not? *Phytopathology* 11: 385-388. 1921 (see Bot. Absts. 11, Entry 2870). (2) The life of *Puccinia Malvacearum* Mont. within the host plant and on its surface. *Phytopathology* 11: 459-463. 1921 (see Bot. Absts. 11, Entry 2869). (3) Das Leben des Malvenrostpilzes (*Puccinia Malvacearum* Mont.) in und auf der Nahrpflanze. (The life of *Puccinia Malvacearum* Mont. in and on the host plant.) *Handl. K. Svensk. Vetenskapsakad.* 62⁵: 1-190. *Fig. 1-31*. 1921.] *Bot. Gaz.* 74: 337-338. 1922.—The reviewer points out that "the widespread opposition to the mycoplasm theory is based on the feeling that the facts may ultimately be accounted for satisfactorily without the theory."—*B. W. Wells*.

2542. SALVAT, P., et M. FONTOYNOT. Contribution à l'étude des Mycoses malgaches. Abcès sous-dermiques dus à l'Endomyces Molardi (n. sp.). [Contribution to the study of Madagascar mycoses. Sub-dermal abscess due to *Endomyces Molardi* n. sp.] *Bull. Soc. Path. Exotique* 15: 311-320. *Fig. 1*. 1922.—The authors describe a new case of mycosis at Tananarive. There are large numbers of infections of fungous origin in the tropical and sub-tropical regions. Many of these are contracted in the warm moist coast regions, and continue to develop even when the carrier attains a higher altitude and a cool, or at least a temperate, climate. The symptoms of the disease are described and its cure in the course of about 2 months by the application of methylene blue.—The culture of the organism is simple. Inoculations were made directly from the abscess after washing with hydrogen peroxide followed by sterile water. Growth is good on most common media, but best on carrot-glycerin, glycerin-gelatine, and unneutralized lactose bouillon. The different forms of the parasite should be studied on liquid media, since the round or oval forms and the filaments are hard to find on solid media. The growth and appearance of the organism on different media are described at considerable length. Its appearance varies according to the medium and the age of the culture. Usually several forms are to be seen together with a predominance of one or another. The filaments are cylindrical, simple or branched, of considerable length, 2-6 μ in diameter, and sometimes constricted at the septa. The septa are irregularly spaced, generally closer together at the distal ends. Some hyphae have a thick wall, while in others it is very delicate. The younger hyphae have finely granular protoplasm, easily stained; the older become vacuolate, and are not easily stained by the analin stains. The filaments may be terminated (1) by a long cell, (2) by a chain of small thick-walled cells, yeast-like in appearance, or (3) by large spherical thick-walled chlamydospores 8-22 μ in diameter. Chlamydospores may be terminal, or they may occur on short side branches or even on the side walls of a filament. Chlamydospores and yeast-like cells frequently may be seen separated from the filaments in groups or isolated. Endospore-like bodies in chains in a filament were also observed. The yeast-like cells may bud and produce filaments or chains of cells like themselves. Certain old cultures developed asci which were spherical or elliptical, were only lightly stained, and contained 4 or rarely 8 ascospores. All the stages of the organism are shown in the figure. Experiments with guinea pigs are described. The authors consider this to be a new pathogenic *Endomyces*, close to but different from *E. albicans* Muguet, and propose the name *Endomyces Molardi*.—*G. H. Godfrey*.

2543. SARTORY, A., et L. MAIRE. Compendium Hymenomycetum. Fasc. I. *Amanita*. 24 p., 2 pl. Le François: Paris.

2544. TORREND, C. *Les polyporacées du Brésil (suite)*. [Brazilian polypores (continued).] *Brotéria Sér. Bot.* 20: 107-112. 1922.—This installment includes the 9 species of *Lignosus* recognized as occurring in Brazil, with brief descriptions, notes upon collections, and an analytic key. The author also discusses several tropical forms that should be compared with Brazilian forms, without venturing any opinion as to their identity. [See also *Bot. Absts.* 8, Entry 1314.]-*E. B. Chamberlain*.

LICHENS

2545. FRY, E. J. *Some types of endolithic limestone lichens*. *Ann. Botany* 36: 541-562. *Pl.* 31, 9 fig. 1922.—This is a study of certain lichens which grow embedded in limestone. The structure of the thallus is similar to that of sub-aerial forms. A classification based on thallus structure is given. In regions of special growth where there is rapid solution of the limestone, numerous spherically inflated hyphae containing oil are found. In slower growing regions oil globules are found in ordinary hyphae. The oil is a waste material. The carbon dioxide of respiration dissolves the rock by forming the soluble bicarbonate. This is precipitated at the surface of the thallus as stable carbonate, causing the granular appearance of the surface of the thallus.—*W. P. Thompson*.

2546. SAMPAIO, GONÇALO. *Materiais para a liquenologia portuguesa*. [Materials towards a Portuguese lichen flora.] *Brotéria Sér. Bot.* 20: 147-163. 1922.—A much annotated list is given of 60 species or varieties of lichens, representing additions to the flora of Portugal or new facts in distribution. Descriptive notes accompany most items. There is 1 new combination, *Catillaria Lightfootii* (Sm.) Samp. (*Biatorina*), and 3 forms are proposed as new, viz: *Verrucaria Carrisoi*, *Polyblastia exigua*, and *Lecidia flavigrana*, all of Sampaio.—*E. B. Chamberlain*.

BACTERIA

2547. ALMQUIST, ERNEST. *Variations and life cycles of pathogenic bacteria*. *Jour. Infect. Diseases* 31: 483-493. 1922.—Studies upon mutation in *B. typhosus*, *Sp. cholera*, *B. diphtheria*, and *Microc. Thulini* when exposed to a considerable range of experimental conditions are reported. Numerous references are also made to the literature upon the subject and space is given to the consideration of the present terminology.—*R. V. Allison*.

2548. BREED, ROBERT S. *Some problems in the nomenclature of bacteria*. [Abstract.] *Absts. Bact.* 6: 484. 1922.—*Bacterium* as a generic name is not justified on nomenclatorial grounds. Breaking up of the colon-typhoid group into distinct genera will soon eliminate the name. *Erythrobacillus* of Fortineau has for its type *E. pyosepticus*, not *E. prodigiosus* Ehren. The first valid name for the red chromogenic rods is *Serratia* of Bizio and the type is *S. marescens*.—*D. Reddick*.

2549. DUBOVSKY, BERTHA J., and K. F. MEYER. *An experimental study of the methods available for the enrichment, demonstration and isolation of B. botulinus in specimens of soil and its products, in suspected food, and in clinical and in necropsy material*. *Jour. Infect. Diseases* 31: 501-540. 1922.—Methods for the enrichment and demonstration of *B. botulinus* are described in detail. Emphasis is laid upon the possible danger of laboratory contamination. The methods applicable for examination of suspected food and clinical and necropsy material are also described in full.—*R. V. Allison*.

2550. DUBOVSKY, BERTHA J., and K. F. MEYER. *The distribution of the spores of B. botulinus in the territory of Alaska and the Dominion of Canada*. V. *Jour. Infect. Diseases* 31: 594-599. 1922.—These studies show that the organism has not been demonstrated in the coast land soil of the Aleutian Archipelago. *B. botulinus*, type A and occasionally type B, has been cultivated in moraine, glacier, and mountain soil collected around Lake Louise in the Canadian Rockies. Likewise soil samples obtained from the provinces of Prince Edward Island, Nova Scotia, Quebec, Ontario, and British Columbia have furnished positive cultures.—*R. V. Allison*.

2551. DUBOVSKY, BERTHA J., and K. F. MEYER. The occurrence of *B. tetani* in soil and on vegetables. VIII. Jour. Infect. Diseases 31: 614-616. 1922.—The spores of *B. tetani* are frequently encountered in well manured, cultivated, or garden soil, and on vegetables obtained from Switzerland, China, and several states east of the Mississippi. In the U. S. A. even virgin forest soil has yielded cultures of *B. tetani*. The soil of the western states is relatively free from this anaerobe.—R. V. Allison.

2552. HUCKER, G. J., and W. A. WALL. The use of agar slants in detecting ammonia production by bacteria and its relation to the reduction of nitrates. [Abstract.] Absts. Bact. 6: 485. 1922.

2553. MEYER, K. F., and BERTHA J. DUBOVSKY. The distribution of *B. botulinus* spores in California. II. Jour. Infect. Diseases 31: 541-555. 1922.—Examinations from widely separated groups of soils, vegetables, fruit, etc., showed *B. botulinus* to be very widely distributed. Evidence is found upon which the authors base the suggestion that the natural habitat of the organism is in the virgin field and forest.—R. V. Allison.

2554. MEYER, K. F., and BERTHA J. DUBOVSKY. The distribution of the spores of *B. botulinus* in the United States. IV. Jour. Infect. Diseases 31: 558-594. 1922.—A study of widely scattered samples from every state except Virginia shows that *B. botulinus* is a common anaerobe in the soils of the western states of the Cordilleran System. It is less frequently found in the Atlantic States, the Great Plains, and the Mississippi valley. The spores of the organism were found to be much more numerous in the virgin and pasture soils than in dirt, soil, or manure obtained from animal corals, etc.—R. V. Allison.

2555. MEYER, K. F., and BERTHA J. DUBOVSKY. The occurrence of spores of *B. botulinus* in Belgium, Denmark, England, the Netherlands and Switzerland. VI. Jour. Infect. Diseases 31: 600-609. 1922.—*B. botulinus* has been demonstrated in soil and vegetable specimens collected in all of the countries mentioned. Type A has been consistently absent. While the spores are widely distributed, they are neither numerous nor very resistant to heat.—R. V. Allison.

2556. ROSEN, H. R. The bacterial pathogen of corn stalk rot. Phytopathology 12: 496-499. 1922.—A brief description is given and the name *Pseudomonas dissolvens* is suggested for the organism causing a stalk-rot of corn (*Zea mays* L.).—B. B. Higgins.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 2338, 2873)

2557. BELL, W. A. A new genus of Characeae and new Merostomata from the Coal Measures of Nova Scotia. Trans. Roy. Soc. Canada (3) 16: 159-167. Pl. 1. 1922.—The author describes undoubted oogonia of *Palaeochara*, a new genus of charophyte characterized by having 6 instead of 5 investing cells and constituting the most ancient known undoubted member of this group.—E. W. Berry.

2558. BENSON, MARGARET. *Heterotheca Grievii* the microsporangium of *Heterangium Grievii*. Bot. Gaz. 74: 121-142. Pl. 4-5, fig. 1-8. 1922.—Sporangia are described from the Pettycur deposits of the Calcareous Sandstone Series of Scotland (Lower Carboniferous) associated with *Heterangium Grievii*. The sporangia resemble *Telangium Scottii*, but have distinctive characters which do not justify their inclusion in that form genus. The differences between *T. Scottii* and *Heterangium Grievii* are: Each peripheral loculus of *Telangium* is represented in *Heterotheca* by a series of relatively small loculi; central loculi as well as peripheral ones occur in the new form; the absence of any evidence that the sporangia of *Hetero-*

theca underwent apical dehiscence; the sporangia of *Heterotheca* contain a new form of water storage tracheids; the sporangia of *Heterotheca* retain the twofold cortical sclerotic plates which are characteristic of the cortex of *Heterangium* stem and petiole.—The author regards the last feature as irrefutable evidence of the safe reference of these microsporangia to *Heterangium Grievii*, with which they have invariably been found associated. Although the sporangium has the same claim to the name of the parent plant as either stem or petiole, the author proposes to refer to it under the name of *Heterotheca Grievii*. The anatomical structure of the new sporangia is discussed and illustrated. The author comes to the conclusion that the structure of *Heterotheca Grievii* is strongly confirmatory of the homology of seed and synangium, and is regarded as supplying ample proof of the synangial origin of the seed. She seems to stand in this investigation upon the threshold of the origin of at least one group of Spermatophyta, and she hopes that the conclusions reached cannot fail to have their influence on other groups. This theoretical discussion is made clearer by a series of figures showing transverse sections of various Pteridosperm ovules and pollen sacks.—The author examines carefully the resemblance between *Heterotheca Grievii* and various ovules and microsynangia which are regarded as homologous with it, especially with *Sphaerostoma ovale*. She is convinced that these 2 form genera represent the microsporangium and the ovule of the same species and that the 2 structures are homologous, both being transformation products of a common ancestor. She also believes in the homology of microsporangia and ovules in the case of all the other Lagenostomales, such as *Lagenostoma*, *Conostoma*, and *Physostoma*.—Turning from the Lagenostomales to the Trigonocarpeae, she asks if they bear any internal evidence of origin from such a type of synangium as *Heterotheca*, and concludes that there is a considerable sum of evidence in support of the homology of the Pteridosperm seeds with a microsynangium such as *Heterotheca*.—A. C. Noé.

2559. BERRY, EDWARD W. Tertiary fossil plants from the Republic of Haiti. Proc. U. S. Nation. Mus. 62: 1-10. 1 pl., 1 fig. 1922.—A small Miocene coastal flora from the Republic of Haiti is described. The species *Pisonia conditi* and *Guettarda cookei* are common to the Miocene of the Dominican Republic in the eastern half of the Island, and the following are described as new: *Chara Woodringi*, *Gymnogramme Woodringi*, *Simaruba haitiensis*, *Mespilodaphne hispaniolana*, *Mimusops praeparvafolia*, *Chrysophyllum cahobasensis*, and *Bumelia cuneatafolia*.—E. W. Berry.

2560. BERRY, EDWARD W., and W. A. JOHNSTON. Pleistocene interglacial deposits in the Vancouver Region, British Columbia. Trans. Roy. Soc. Canada (3) 164: 133-139. Pl. 1-2. 1922.—An account is presented of Pleistocene interglacial beds near Vancouver with the identification of the following fossil plants: *Salix Barclayi* Anders (?), *S. myrtilloides* L., *Populus* sp., *Arctostaphylos* sp., *Kalmia glauca* Ait, *Chamaedaphne calyculata* (L) Moen., and *Vaccinium ovalifolium* J. E. Smith.—E. W. Berry.

2561. ENGELHARDT, H. Die Alttertiär Flora von Messel bei Darmstadt. [The early Tertiary flora from Messel near Darmstadt.] Abh. Hess. Landes. 74: 21-128. Pl. 1-40. 1922. This is a posthumous publication, edited by MENZEL, of the veteran paleobotanist of Dresden. A large flora of 359 nominal species is described from Messel in Hesse, with the following composition: 1 fern, 1 cycad, 9 conifers, 12 monocotyledons, 323 dicotyledons, and 13 Phyllites, Carpolithes, and Leguminosites. The facies is intermediate between Eocene and Oligocene and is considered to indicate an upper Eocene age. The abundance of Moraceae, Lauraceae, Apocynaceae, Sapotaceae, Myrtaceae, Celastraceae, Sapindaceae, and Leguminosae give this flora a subtropical character and indicate considerably warmer climatic conditions at the time it flourished than prevail at the present time in corresponding latitudes. The plants show predominating affinities with the existing floras of the East Indies, Australia, Central and South America. The following are the new species: *Podozamites coccaenica*, *Amomum tertiarium*, *Piper europaeum*, *Macropiper rotundifolium*, *Quercus lineari-lanceolata*, *Ficus undulata*, *F. angustifolia*, *F. lauroides*, *F. laurifolioides*, *F. eocaenica*, *F. populifolia*, *F. ovalifolia*, *F. subdimidiata*, *F. ovato-lanceolata*, *F. messelensis*, *F. daphnogenoides*, *F. ovalifolia*, *F. rotundifolia*,

F. orbicularis, *F. callosaeoides*, *Laurelia tertiaria*, *Laurus messelensis*, *L. Friedrichi*, *Persea lanceolata*, *Litsea chattia*, *Sassafras primigenioides*, *S. subdimidiatum*, *Oreodaphne eocaenica*, *Cinchonidium acuminatifolium*, *Morinda tertiaria*, *Ixora tertiaria*, *Notelaea prisca*, *Apocynophyllum ellipticum*, *Echites* ? *tenuifolia*, *Alstonia eocaenica*, *Nerium eocaenicum*, *N. germanicum*, *Neritinium Unger*, *Vitex* ? *pentamera*, *Catalpa Spiegeli*, *Myrsine semiserrulata*, *Maesa europaea*, *Archras protosapota*, *Sapotacites eocaenicus*, *S. Schottleri*, *S. sideroxylenoides*, *Mimusops ballotaoides*, *M. versimilis*, *Chrysophyllum elongatum*, *Diospyros ebenordes*, *Bacca diospyroides*, *Styrax eocaenica*, *S. ovatifolia*, *Gaultheria germanica*, *Hedera pristina*, *Knema tertiaria*, *Magnolia grandifolia*, *M. pristina*, *M. multinervis*, *M. lauriodes*, *Bombax Lepsii*, *Sterculia cinnamomifolia*, *S. grandifolia*, *Pterospermum chatianum*, *P. Steuerei*, *Grewia microcoides*, *G. tenuifolia*, *Tetrapteris messelensis*, *Banisteria tertiaria*, *Sapindus lanceolatus*, *S. firmifolius*, *Thouinia occidentalis*, *Staphylea germanica*, *Celastrus illicinoides*, *Elaeodendron obovatifolium*, *Ptilosporum eocaenicum*, *Pomaderris lanigeroides*, *P. grandifolia*, *Carya hickoryaeformis*, *Rhus ternata*, *R. longifolia*, *Anaphrenium europaeum*, *A. lanceolatum*, *Mangifera tertiaria*, *Melastoma tertiarium*, *Eugenia Heerti*, *Tristania laurinaoides*, *T. tertiaria*, *Callistemon lanceolatum*, *Myrtophyllum incertum*, *M. myrciaefolium*, *Acmena floribundoides*, *Phaseolites eocenica*, *Dolichos* ? *pristina*, *Hardenbergia macrophyloides*, *Machaerium muticoides*, *Cercis grandifolia*, *C. parvifolia*, *Bauhinia europaea*, *Caesalpinia mediocrifoliola*, *Copaifera tenuifolia*, *Leguminosites trigonellaeformis*, *L. cassioides*, *Mimosites Spiegeli*.—E. W. Berry.

2562. PRINCIPI, P. *Flora Messeniana di Polenta in Provincia di Forli*. [Messianian flora of Polenta in the province of Forli.] Riv. Ital. Palaentol. 28: 5-19. Pl. 1. 1922.—The following Mio-Pliocene species are recorded from this locality: *Sequoia Langsdorffii*, *Phragmites oeningensis*, *Carpinus pyramidalis*, *Fagus Antipoffi*, *F. dentata*, *Castanea entymodryis*, *C. Scarbelli*, *C. proteifolia*, *Populus mutabilis*, *Planera Unger*, *Acer controversum*, *Platanus deperdita*, *Terminalia pannonica*, *Cercocarpus Minischalchii*, *Sophora europaea*, *Cassia phaseolites*, *C. Fischeri*. All are well known species of the late Tertiary of Europe.—E. W. Berry.

2563. PRINCIPI, P. *Nuovo contributo allo studio delle Tallofite, Pteridofite, Gimnosperme e Monocotiledoni fossili del giacimento Oligocenico di Santa Giustina e Sassello in Liguria*. [New contribution to the study of the fossil Thallophyta, Pteridophyta, Gymnospermae, and Monocotyledonae of the Oligocene of Santa Giustina and Sassello in Liguria.] Mem. Com. Geol. Ital. 7: 1-90. Pl. 1-7. 1921.—This work completes the description of this extensive and important Oligocene flora, the many dicotyledons from which were described by the same author 2 years previously. The present work treats of 5 algae, 4 fungi, 2 equisetes, 43 ferns, 10 gymnosperms, and 58 monocotyledons from these localities. The specific lines are very finely drawn and often based upon very incomplete specimens. The following are described as new: *Fucus antiquus*, *Equisetum grande*, *Adiantum oligocenicum*, *Pteris protogaea*, *Asplenium Laurenti*, *A. Schimper*, *Aspidium gracile*, *Goniopteris minuta*, *G. Heeri*, *Cyperus antiquus*, *Arecites longus*, *Phoenicites Isseli*, *Palaeospatha deVisianii*, *Palmophyllum Engelhardti*, *Irites grandifolium*.—E. W. Berry.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 2229, 2238, 2243, 2249, 2271, 2275, 2281, 2314, 2320, 2337, 2352, 2357, 2358, 2359, 2360, 2366, 2372, 2377, 2385, 2403, 2404, 2412, 2417, 2422, 2435, 2436, 2448, 2461, 2465, 2469, 2483, 2490, 2494, 2495, 2496, 2503, 2508, 2512, 2538, 2540, 2541, 2542, 2556, 2719, 2730, 2773, 2782, 2783, 2785, 2787, 2788, 2789, 2807, 2809, 2890, 2894, 2895)

DISEASES CAUSED BY FUNGI

2564. ANONYMOUS. *Potato trials at Ormskirk*. Nature 110: 431. 1922.—Tests upon 2,500 stocks are being made in 1922 with reference to resistance to wart disease (*Synchytrium endobioticum*). It is evident that rainfall has a considerable effect, the disease appearing earlier and being more pronounced in 1922 than during the dry summer of 1921.—O. A. Stevens.

2565. ANONYMOUS. Root disease of coffee in India. *Tropic. Life* 18: 107. 1922.—The article is a quotation from: ANSTEAD, R. I. Root disease of coffee. *Planters' Chron.* 17: 286-287. 1922.—The disease is caused by *Hymenochaete noxia* Berk. and is said to arise from rotting stumps and roots of dead jungle and shade trees. The fungus, developing on the decaying roots of trees, later enters the living roots of the coffee bushes and causes death or serious impairment. The trees chiefly concerned in producing infection are white cedar, cinnamon, Bassari, Jack, and Atti. Complete removal of the stumps of any of these trees, or others known to act as host for the disease, from fields devoted to coffee production or designed for that purpose, is the remedy suggested. Infected coffee bushes and roots should be removed and burned, and the ground thoroughly limed.—H. N. Vinall.

2566. ANONYMOUS. White-pine blister rust in the western United States. U. S. Dept. Agric. Circ. 226. 7 p., 9 fig. (5 colored). 1922.—“Until very recently our great forests of western white pine (*Pinus monticola*) and sugar pine (*P. lambertiana*) have been free from this disease, *Cronartium ribicola* Fischer, but in the autumn of 1921 the blister rust was found in western British Columbia and the Puget Sound region of Washington.”—L. R. Hesler.

2567. BARSS, H. P. Destructive rust (*Puccinia subnitens* Dietel) on spinach in the Northwest [U. S. A.]. [Abstract.] *Phytopathology* 12: 446. 1922.

2568. BEWLEY, W. F. Anthracnose of the cucumber under glass. *Jour. Ministry Agric. Great Britain* 29: 469-472, 558-562. 1922.—This is now the most important leaf spot disease of the cucumber in Great Britain, causing heavy annual losses. The overwintering and control of the causal organism, *Colletotrichum oligochaetum* Cav., have been studied, and the following conclusions drawn: The fungus “carries on a saprophytic existence in rotten woodwork, timber, paper, etc., in the glass houses, and thus tides over the winter period. Straw manure from towns constitutes an important source of infection. Infected houses may be cleansed by spraying the interior woodwork during the winter with emulsified cresylic acid. The disease may be controlled during the growing season by employing drastic methods of ventilation, or by alternately spraying the plants with liver of sulphur or lime-sulphur and flour paste, and removing the spotted leaves.”—M. B. McKay.

2569. BIRS, P. M. Le Polyporus (*Ungulina*) *Inzengae* De Not., parasite du peuplier. [Polyporus *Inzengae* as a parasite of *Populus*.] *Bull. Soc. Path. Vég. France* 9: 166-168. 1922.—This fungus seems to be a wound parasite, destroying the lignin in wood, and causing the trunks to break easily.—J. Dufrenoy.

2570. BOYCE, J. S. White pine blister rust in the Pacific Northwest [U. S. A.]. [Abstract.] *Phytopathology* 12: 448. 1922.

2571. BROWN, WILLIAM. Studies in the physiology of parasitism. IX. The effect on the germination of fungal spores of volatile substances arising from plant tissues. *Ann. Botany* 36: 285-300. 1922.—The author placed the tissues in large Petri dishes, side by side with clean slides carrying aqueous suspensions of spores,—those of *Botrytis cinerea* proving most convenient. In general the effects were more marked when the leaves or tissues were first bruised. The presence of certain plant tissues, such as apple leaves and the leaves of *Ruta*, *Eucalyptus*, etc., increased spore germination. In other cases there was reduced germination or even inhibition with tissues of potato tuber, onion leaves, or bulb scales. The effect was more easily discernible when the spores were of feeble germinating capacity. Similar stimulating and retarding effects were produced by certain simple chemical substances such as ethyl acetate. A few other fungi behaved as did *Botrytis cinerea*. Experiments proved that the carbon dioxide evolved is not the agent affecting germination. The action is due to volatile substances arising from the tissues. These volatile stimulants were sufficient to increase markedly the parasitic powers of *Botrytis* spores. It was found that the presence for some time of wet blotting paper in the Petri dishes retarded germination; all

results indicated that this was due to some organism or organisms present on the paper. The effect of these results on mycological technique and on problems of parasitism is discussed.—*W. P. Fraser.*

2572. CARLETON, M. A. Note on the fusarium wilt disease of bananas. *Science* 56: 663-664. 1922.—The writer performed inoculation experiments confirming those of E. W. Brandes, who proved that the so called "Panama disease" of bananas is caused by *Fusarium Cubense* EFS.—Plants growing in pots of sterilized soil and inoculated with pure cultures of *Fusarium Cubense* all contracted the disease, while all checks remained healthy.—*C. J. Lyon.*

2573. CHABROLIN, CH. Les dépérissements de l'abricotier dans la vallée du Rhône. [Diseases of apricots in the Rhone Valley.] *Bull. Office Regional Agric. Midi* 1922¹: 24-37. 1922.—This most perplexing disease of apricots consists in a total or partial wilting of the trees, which may occur at any period of the year. The phloem tissues of wilted branches show a conspicuous browning and may be infected by various fungi, a *Cytospora* being chiefly described.—*Coryneum* and *Monilia* are responsible for much loss.—*J. Dufrénoy.*

2574. CHRISTIAN, J., et L. DUCCELLIER. L'ergot de l'avoine en Algérie. [Ergot of oats in Algeria.] *Bull. Agric. Algérie-Maroc Ser. 2*, 28: 121-138. 2 fig. 1922.—This article discusses the spread of ergot of oats in Algeria and its attendant danger; the different modes of propagation of the causal fungus; the presence of ergot infection, which may pass unnoticed; the large number of grasses which may act as possible carriers, since the specialization of this ergot on oats alone is not yet demonstrated; the use of clean seed; incineration of refuse after threshing; elimination of ergot of oats in the seed with saline solutions, and the advisability of this method of treatment in infected regions; and the importance of the destruction of weed grasses in and near oat fields before blossoming time. [See also Bot. Absts. 12, Entry 2579.]-*Frederick V. Rand.*

2575. DARNELL-SMITH, G. P. Fungus and other diseases of stone fruits. *New South Wales Dept. Agric. Farmers Bull.* 133. 23 p., 15 fig. 1920.—Popular descriptions and suggested treatments are given for 4 diseases: peach leaf curl (*Exoascus deformans* (Berk.) Fekl.), brown rot (*Sclerotinia fructigena* (Pers.) Schr.), rust (*Puccinia prunispinosae* Pers.), and peach freckle (*Cladosporium carpophilum* Thüm.). The ascigerous stage of brown rot has not been noticed as occurring in Australia.—*L. R. Waldron.*

2576. ELLIOTT, JOHN A., and R. F. CRAWFORD. The spread of tomato wilt by infected seed. *Phytopathology* 12: 428-434. Pl. 28, fig. 1-2. 1922.—Seed from tomato fruits that were thoroughly invaded by the wilt fungus (*Fusarium Lycopersici* Sacc.) were saved by the usual method and stored for several months. They were then planted on sterile moist filter paper; and all fungi growing from the seed which resembled *F. Lycopersici* were isolated and studied. The final test in all cases was the ability of the isolated fungus to produce tomato wilt. Approximately 3½ per cent of the seed carried the wilt fungus, which in some cases seemed to have entered the seed coat.—*B. B. Higgins.*

2577. FAWCETT, HOWARD S. A new Phomopsis of Citrus in California. *Phytopathology* 12: 419-424. Fig. 1-2. 1922.—A Phomopsis, resembling *P. Citri* Fawcett, has been found causing a stem-end rot of citrus fruits in California packing houses. Comparison of the 2 fungi in culture and in their ability to attack citrus fruits showed such marked differences that the California fungus is considered a distinct species. It is named and described as *Phomopsis californica* n. sp.—*B. B. Higgins.*

2578. F[OËX], E. Dépérissement des ormes (*Ulmus campestris* et autres espèces d'*Ulmus*). [Dying of elms.] [Rev. of: (1) SPIERENBURG, DINA. Een onbekende ziekte in de iepen. [An unknown disease of the elm.] Verslag. en Mededeel. Plantenziek. Wageningen 18: 1-10. 1918. (2) SCHWARZ, M. B. Das Zweigsterben der Ulmen Trauerweiden und

Pfirsichbäume [Twig blight of elms, weeping willows, and peach trees.] Thesis, Univ. of Utrecht. 1922. (3). Guyot. Note de pathologie végétale. [Note on plant pathology.] Bull. Soc. Path. Vég. France 8: 132-136. 1921 (see Bot. Absts. 11, Entry 2955).] Bull. Soc. Path. Vég. France 9: 200-204. 1922.—Since 1918 elms have died in great numbers in France, Belgium, and Holland. The disease is more severe in young trees than in old, and may cause death of whole or parts of trees. Brown spots appear in the wood and the leaves wither. No organism was demonstrated directly in discolored wood, but in culture a *Cephalosporium-Graphium* accompanied by bacteria was obtained. Mlle. Schwarz obtained infections with a pure culture of *Graphium Ulmi* inoculated into either wood or bark.—*Lillian C. Cash.*

2579. F[OËX], E. **L'ergot de l'avoine en Algérie.** [Ergot of oats in Algeria.] [Extract and rev. of: CHRISTIAN, J., et L. DUCELLIER. **L'ergot de l'avoine en Algérie.** Bull. Agric. Algérie-Maroc Ser. 2, 28: 121-138. 2 fig. 1922 (see Bot. Absts. 12, Entry 2574).] Bull. Soc. Path. Vég. France 9: 196-199. 1922.—Ergot can be separated from healthy seed by floating on an 8 per cent solution of nitrate of soda.—*J. Dufrénoy.*

2580. GRINȚESCU, IOAN. **Le noir des blés en Roumanie.** [The brown rust of grain in Rumania.] Bul. Soc. Științe Cluj 1: 292-295. 1921.—The author first observed this disease in Rumania in 1920 when it was sent to him from the vicinity of Bucharest. It was reported from other stations in Rumania especially in Banat the same year. In studying the disease the author found that the plants were attacked by 3 species of fungi, *Cladosporium graminis* Cda., *Alternaria tenuis* Nees, and *Fusarium avenaceum* (Fr.) Sacc. The author is convinced from his experiments that the trouble is due to *Fusarium avenaceum*; the other 2 fungi are saprophytic and have a secondary significance. Inoculations with all 3 forms were negative.—*M. Tiesenhausen.*

2581. GUINIER, P. **La "dorge" ou "chaudron" du sapin.** [The burl or canker of fir.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 333-347. 3 pl. 1922.—Canker-like burls are frequent on trunks of *Abies alba* in the Jura Mountains. They may be annular or unilateral, open or closed, dry or rotted. The wood of these growths has a special structure, the annual rings being sinuous and of irregular width; resinous streaks of bark are often included in the reddish wood. The effect on growth is almost negligible, but the value of the wood is reduced because of the loss of $\frac{1}{2}$ -1 m. in the best part of the trunk; the loss in volume is about 5 per cent, in value about 10 per cent. The cankers develop at points where witches' brooms have fallen off. The 2 deformities are caused by successive stages in the development of *Aecidium elatinum*, which has an alternate stage on members of the family Alsineae, *Stellaria nemorum* being the most abundant species in the Jura fir forests. There is no remedy after the canker is formed, but cutting the witches' brooms offers a method of attack for young trees. Fifty per cent of the brooms are less than 7 m. above the ground. The cutting is not expensive, and should be repeated every 5 or 10 years.—*J. Kittredge, Jr.*

2582. HORNE, WM. TITUS. **A Phomopsis in grape fruit from the Isle of Pines, W. I., with notes on *Diplodia natalensis*.** Phytopathology 12: 414-418. Pl. 26-27, fig. 1. 1922.—In a shipment of grape fruit from the Isle of Pines 2 specimens showing a tan colored rot were found. Tissue cultures from one of these gave *Diplodia natalensis*. From the other, cultures of a *Phomopsis* were obtained. Inoculations, made by placing either mycelium or spores of the *Phomopsis* on the calyx or on wounded calyx scars of grape fruits held in moist chambers, produced typical stem-end rot. However, the fungus differed from *Phomopsis Citri* Fawcett, both morphologically and in the growth on culture media, sufficiently to be considered distinct. The name *Phomopsis caribaea* n. sp. is suggested.—*B. B. Higgins.*

2583. HORTON, E., and E. S. SALMON. **The fungicidal properties of certain spray-fluids.** III. Jour. Agric. Sci. 12: 269-279. 1922.—To ensure comparable results similar cuttings from a single hop vine (*Humulus Lupulus* L.) were used, and observations made on leaves of similar age. Inoculations were made with the "powdery" conidial stage of *Sphaerotheca*

Humuli (DC.) Burr. To secure complete wetting of the fungus 1 per cent of calcium caseinate was added to the solutions. One leaf at a node was utilized for the "test," the other serving as control. Disodium arsenate containing 0.096 per cent As_2O_5 proved fungicidal and killed patches of leaf-cells underlying the mildew patches but did not otherwise injure the leaf. A solution containing 0.02 per cent As_2O_5 was fungicidal without killing any leaf-cells. Trisodium arsenate containing 0.077 per cent As_2O_5 and dicalcium arsenate containing 0.048 per cent As_2O_5 also proved fungicidal. Dicalcium arsenate in solution containing 0.024 per cent As_2O_5 proved to be barely fungicidal in its action. Tricalcium arsenate containing 0.076 per cent As_2O_5 is fungicidal and a solution of 0.02 per cent has some value; but a solution with but 0.01 per cent of As_2O_5 is practically non-fungicidal. The following constituents of lime-sulphur wash proved non-fungicidal: calcium sulphate, sulphite, thiosulphate, and hydroxyhydrosulphide. However, calcium polysulphide at a strength of 0.11 per cent proved fungicidal. A bibliography of 20 numbers is included.—V. H. Young.

2584. HUBERT, ERNEST E. A staining method for hyphae of wood-inhabiting fungi. *Phytopathology* 12: 440-441. 1922.

2585. HUNGERFORD, CHAS. W. A fusarium blight of spinach. [Abstract.] *Phytopathology* 12: 447. 1922.

2586. HYDE, KARL C. Anatomy of a gall on *Populus trichocarpa*. *Bot. Gaz.* 74: 186-196. *Pl. 6.* 1922.—This paper is concerned with a lateral stem swelling caused by *Macrophoma tumefaciens* Shear on poplar. The gall structure differs from that of the normal stem in the following respects: the rays are multiseriate instead of uniseriate; the xylem elements are greatly distorted; a marked increase in size and number of cells occurs in the gall bark; the amount of suberized tissue is greatly increased; and an abnormally large number of phloem parenchyma cells are formed. The writer believes that the abnormal xylem is incapable of satisfactorily conducting water and solutes to the stem portion beyond the gall. This accounts for its weakening and death.—B. W. Wells.

2587. JONES, L. R., and W. B. TISDALE. The influence of soil temperature upon the development of flax wilt. *Phytopathology* 12: 409-413. *Fig. 1.* 1922.—The seed of a very susceptible variety of flax were planted in cans of soil infested with *Fusarium Lini* Bolley. The cans were placed in soil temperature tanks held at graduated intervals between 12 and 38°C. The percentage of plants which had wilted at the end of a 24-day period was taken as a basis of comparison. The minimum temperature for the development of the wilt disease was about 14°C., the maximum 38°C., and the optimum between 24 and 28°C. This relation of disease to temperature shows close correlation with the development of the fungus in culture.—B. B. Higgins.

2588. KEMPTON, F. E. Progress of barberry eradication. U. S. Dept. Agric. Dept. Circ. 188. 37 p., 4 fig. 1921.—The relation of barberries and Mahonias to the stem rust situation is summarized. The origin, organization, and methods of the campaign are discussed. The results of the campaign are further summarized by years and by states. In 3 years almost all cities, towns, and villages in the 13 states of the eradication area were surveyed. In the farm-to-farm survey an area which approximates 183 counties was covered in the original survey, but the necessary resurvey was made in only a few of these counties.—L. R. Hesler.

2589. LEONIAN, LEON H. Stem and fruit blight of pepper caused by *Phytophthora Capsici* sp. nov. *Phytopathology* 12: 401-408. *Fig. 1-2.* 1922.—A hitherto unreported disease of pepper (*Capsicum annuum* L.) is described. On the pods soft decayed spots are produced, which soon dry and become leathery. On old parts of the stem brownish lesions are produced, which usually girdle the stem killing the parts beyond; but on younger parts the pathogen passes rapidly through until halted by the older hard tissues. The disease is produced by a new species of *Phytophthora* which is described as *P. Capsici*. The fungus is carried in seed from diseased pods; therefore seed selection and sterilization are recommended as control measures.—B. B. Higgins.

2590. LINK, G. K. K., and F. C. MEIER. Anthracnose of muskmelons. U. S. Dept. Agric. Dept. Circ. 217. 4 p., 1 pl. 1922.—This is a popular account of the disease caused by *Colletotrichum lagenarium* (Pers.) E. & H., including symptoms, nature of losses, environmental influences, and control.—L. R. Hesler.

2591. LINK, G. K. K., and F. C. MEIER. Fusarium tuber rot of potatoes. U. S. Dept. Agric., Dept. Circ. 214. 8 p., 2 pl. 1922.—The nature, symptoms, and control of the disease caused by *Fusarium* sp. are discussed in a popular manner.—L. R. Hesler.

2592. LINK, G. K. K., and F. C. MEIER. Late-blight tuber rot of the potato. U. S. Dept. Agric. Dept. Circ. 220. 5 p., 2 pl. 1922.—The nature of the damage, occurrence, conditions favoring, and the control of the disease caused by *Phytophthora infestans* (Mont.) de Bary are given.—L. R. Hesler.

2593. LINK, G. K. K., and F. C. MEIER. Phoma rot of tomatoes. U. S. Dept. Agric. Dept. Circ. 219. 5 p., 1 pl. 1922.—Phoma blight and rot, caused by *Phoma destructiva* Plowr., occur most frequently in southern winter-grown tomatoes, i.e., in the crops of California, Cuba, Florida, and Mexico. The main source of infection is the soil; the fungus develops on the vegetative portion of the tomato and later attacks the fruit through injuries in the skin, most frequently at the stem end either through growth cracks or the fruit-stem scar. On ripe fruits there appear water-soaked concave spots which rapidly enlarge but remain more or less circular and concave with brown or black, firm, leathery centers dotted with the black fruiting bodies from which are extruded the slimy whitish spore masses. The fungus attacks the leaves, petioles, and stems. Spots on the leaves frequently begin at the margin as small discolored areas which become brown or black, enlarge, and finally merge into a large blotch of definite outline but irregular shape.—Lillian C. Cash.

2594. MCKAY, M. B. *Thielavia basicola* on watermelon in Oregon. [Abstract.] Phytopathology 12: 445. 1922.

2595. McMURPHY, JAMES. Notes on *Synchytrium*. [Abstract.] Phytopathology 12: 442. 1922.

2596. MANEVAL, W. E. Germination of teliospores of rusts at Columbia, Missouri. Phytopathology 12: 471-488. 1922.—The teliospores of several rusts were collected at intervals during the fall, winter, and spring and germinated by floating on the surface of water in covered culture dishes kept at approximately 20°C. The species used in the tests were: *Phragmidium Potentillae-canadensis* Diet.; *Puccinia Asparagi* DC.; *P. Helianthi* Schw.; *P. Menthae* Pers. var. *americana* Burr.; *P. Ruelliae* (B. & Br.) Lagh.; *P. Andropogonis* Schw.; *P. peridermiospora* (Ell. & Tracy) Arth.; *P. Sorghi* Schw.; *P. Sydowiana* Diet.; and *P. Windsoriae* Schw. The teliospores of all germinated in December or earlier. As the season advanced toward spring the percentage of germination increased and the necessary period of incubation decreased.—B. B. Higgins.

2597. MOSS, E. II. Observations on two poplar cankers in Ontario. Phytopathology 12: 425-427. 1922.—A canker, produced by *Dothichiza populea* Sacc. & Briard, was found in a very destructive form on newly planted trees of Lombardy poplar (*Populus nigra* L. var. *italica* Du Roi) at Toronto, Canada. This fungus was also found attacking branches of older trees in various localities in southern Ontario. In the neighborhood of Toronto, also, *Cytospora chrysosperma* (Pers.) Fr. has been found attacking *Populus deltoides*, *P. nigra* L. var. *italica* Du Roi, *P. balsamifera*, *P. alba*, and *Acer saccharinum*.—B. B. Higgins.

2598. PATOUILLARD, M. N. Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XII. Quelques champignons saprophytes des arbres à S. Thomé. [Some fungus saprophytes of trees in St. Thomas.] p. 9-10, pl. 4 5. Sec. Tech.

et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1921.—This is an annotated list of the following: *Stemonites splendens* Mg., *Daldinia concentrica* Ces., *Trameetes Persoonii* Mtg., *Polyporus ligrosus* Kl., *Hexagona discopoda* Pat. & Har., *Ganoderma fulvellum* Bres.—*Frederick V. Rand.*

2599. PAXTON, G. E. Studies on *Helminthosporium* species found on cultivated barley in California. [Abstract.] *Phytopathology* 12: 446-447. 1922.

2600. POLE EVANS, I. B., and MARY POLE EVANS. Rise in temperature of living plant tissue when infected by parasitic fungus. *Nature* 110: 480-481. 1922.—The writers found a definite rise of temperature in oranges and grape fruit following inoculation with *Penicillium digitatum*. Further account of the experiments is promised.—*O. A. Stevens.*

2601. POOLE, R. FRANK. A new fruit rot of tomatoes. *Bot. Gaz.* 74: 210-214. *Pl.* 7. 1922.—Cracking of green and ripe fruit of certain tomato varieties in New Jersey was found to be caused by *Oidium* or *Oospora lactis*. Inoculations of ripe fruit gave positive results. On the fruit the mycelium is prominent and appears as a dense grayish white layer. Slight control was achieved with Bordeaux sprays and dusts. The fungus is widely distributed, being known also on cheeses and decaying vegetables.—*B. W. Wells.*

2602. RAEDER, J. M. A *Helminthosporium* root rot of wheat in Idaho. [Abstract.] *Phytopathology* 12: 447. 1922.

2603. RAEDER, J. M., and CHAS. W. HUNGERFORD. The effect of presprinkling with water upon the efficiency of certain potato seed treatments for the control of *Rhizoctonia*. [Abstract.] *Phytopathology* 12: 447-448. 1922.

2604. RAMSEY, G. B. *Basisporium gallarum* Moll., a parasite of the tomato. *Bot. Gaz.* 74: 325-328. *Fig.* 1-11. 1922.—This fungus is reported to induce a soft, red, blister-like lesion near the blossom end of ripe tomatoes. Inoculations on wounded fruit "have shown conclusively that the fungus is strongly pathogenic." On unwounded surfaces negative results were obtained. The fungus grows readily on most nutrient agars.—*B. W. Wells.*

2605. RAST, LOY E. Control of cotton wilt by the use of potash fertilizers. *Jour. Amer. Soc. Agron.* 14: 222-224. *Fig.* 1-3. 1922.—In 1920 a 5-acre cotton field on alluvial river land near Scott, Arkansas, was destroyed by wilt. A part of the field had been treated with a fertilizer containing 10 per cent phosphoric acid, 3 per cent nitrogen, and no potash. The following year the same fertilizer was mixed with an equal amount of kainit containing 12.5 per cent potash and applied at the rate of 1,000 pounds per acre. On the unfertilized acre used as a check, 95 per cent of the plants died, whereas in the fertilized field there was no noticeable injury.—*Lillian C. Cash.*

2606. RICHARDS, B. L. *Corticium vagum* as a factor in potato production. [Abstract.] *Phytopathology* 12: 444. 1922.

2607. RICHARDS, B. L. Relation of rainfall to the late blight of (?) *Phoma* rot of the sugar-beet. [Abstract.] *Phytopathology* 12: 443. 1922.

2608. SCHMITZ, HENRY. Note concerning the decay of western yellow pine slash caused by *Polyporus volvatus* Peck. *Phytopathology* 12: 494-496. *1 fig.* 1922.—Observations indicate that *P. volvatus* is at least weakly parasitic on western yellow pine.—*B. B. Higgins.*

2609. SMITH, ELIZABETH H., and EDITH H. PHILIPS. Fig smut studies. [Abstract.] *Phytopathology* 12: 442. 1922.

2610. STEVENS, F. L. A fungus destructive to asphalt shingles. *Phytopathology* 12: 497. 1 fig. 1922.

2611. WEBER, GEORGE F. *Septoria* diseases of cereals. *Phytopathology* 12: 449-470. Pl. 29-30, fig. 1-5. 1922.—This is the 1st of a series of 3 papers on this subject. Except for a brief introduction the paper is devoted entirely to a discussion of "speckled blotch" of oats, which has been collected twice near Madison, Wisconsin. It has been known in Europe since 1895, but has not been reported previously from the U. S. A. The disease is produced by *Leptosphaeria avenaria* sp. nov. (= *Septoria Avenae* Frank). Small, circular to elliptical or elongate, dead, faded lesions are produced on the leaves of the oat plant. The dead areas soon become speckled with the black pycnidia of the fungus. The ascigerous stage has not been found on the host plant, but numerous perithecia with mature ascospores have been found in potato-agar and oatmeal-agar cultures obtained from single pycnosporos. The disease has been reproduced by inoculating oat plants with either ascospores or pycnosporos from these cultures. Inoculations were also made on various cultivated and wild grasses but infections were obtained only on species of *Avena*. The morphology and the more important physiological reactions of the fungus are described.—B. B. Higgins.

2612. WHETZEL, H. H. The pink-root of onions. *Agric. Bull. Bermuda Dept. Agric.* 1922: 4-6. July, 1922.—This disease, caused by *Fusarium mali* Allesch., is reported as very severe in Bermuda and is considered the chief factor in the 50 per cent reduction of the onion crop shown by the official records of yields for the past 10 years. A method of control is suggested.—H. H. Whetzel.

2613. WILLAMAN, J. J., and F. R. DAVISON. Biochemistry of plant diseases. IV. Proximate analysis of plums rotted by *Sclerotinia cinerea*. *Bot. Gaz.* 74: 104-109. Fig. 1-2. 1922.—Four varieties of plums in 3 stages of maturity were employed. Determinations were made of the ash content, calcium, nitrogen, ether extract, and crude fiber of sound and rotted fruits, the latter proving higher in ash, CaO, nitrogen, and ether extract than sound ones. Further, resistant varieties were conspicuously higher in crude fiber than susceptible ones, but were lower in ash, CaO, nitrogen, and ether extract. During the process of normal ripening there is a decrease of ash, CaO, and nitrogen content due probably to storage of carbohydrates and acids.—F. A. Wolf.

2614. WINGARD, S. A. Yeast-spot of lima beans. *Phytopathology* 12: 525-532. Fig. 1-4. 1922.—A diseased condition of lima beans (*Phaseolus lunatus* L.), in which dark brown sunken spots are produced on the seed, has been observed in 7 counties of eastern Virginia. In some lots 60 per cent of the seed showed infection. Numerous isolations from diseased tissue gave pure cultures of a yeast. Inoculations made by spraying green uninjured pods with suspensions of the yeast or smearing uninjured pods with pure cultures of the yeast failed to produce infection; but the disease is readily reproduced by pricking the pods with a needle dipped in a pure culture of the yeast. The organism is considered a new species and the name *Nematospora Phaseoli* is proposed. The same or a similar disease has been collected on black eyed pea (*Vigna sinensis* Hassk.).—B. B. Higgins.

2615. WINSTON, JOHN R. Commercial control of citrus scab. U. S. Dept. Agric. Circ. 215. 8 p. 1922.—Important facts on the origin and geographical occurrence, importance, susceptibility, overwintering of the causal fungus, and control are given. The organism is usually but erroneously referred to as *Cladosporium Citri* Massee. Plain Bordeaux mixture as well as Bordeaux-oil emulsion is very effective against scab either in the orchard or nursery. Burgundy and ammoniacal copper carbonate, and lime sulphur are less effective than Bordeaux. Schedules for spraying are given for types of localities with regard to severity of the disease.—L. R. Hesler.

2616. WORMALD, H. Further studies of the 'brown rot' fungi. A shoot-wilt and canker of plum trees caused by *Sclerotinia cinerea*. Ann. Botany 36: 305-320. Pl. 13, 14. 1922.—The attack begins on the leaves soon after they are unfolded. The mycelium extends from the shoots into the twigs causing cankers and gummosis of the diseased tissues. Conidia of *Monilia cinerea* (Bon.) Schröter sometimes develop on the dead leaves in wet summer weather, but not on the cankers till the following winter and spring. Inoculation of the leaves on short shoots with a pure culture of the fungus isolated from cankers resulted in infection of the leaves followed by cankers on the twigs. Inoculated apple blossoms were killed but infection failed to enter the axis of the inflorescence since the other flowers and leaves of the same shoot remained healthy. The fungus causing the wilt was determined as *Sclerotinia cinerea* (Bon.) Schröter, forma *Pruni*. This determination was supported by the slow rate of secretion of an oxidase when compared with forma *Mali*. The wilt is compared with wither-tip caused by the same fungus. The direct loss due to this wilt is small, but the cankers may prove a source of infection for the next season.—W. P. Fraser.

2617. ZELLER, S. M. A "plum pocket" on *Prunus subcordata* in Oregon. [Abstract.] Phytopathology 12: 443. 1922.

DISEASES CAUSED BY BACTERIA

2618. FROMME, F. D., and S. A. WINGARD. Blackfire or angular-leafspot of tobacco. Virginia Agric. Exp. Sta. Tech. Bull. 25. 43 p., 2 pl., 18 fig. 1922.—Following a discussion of the history, range, and economic importance of blackfire (*Bacterium angulatum*) the authors compare symptoms on seedlings and field plants with those of wildfire and other leafspots of tobacco. Laboratory and field experiments and observations on dissemination, development of infection, and control are described. The occurrence of blackfire in the field is determined largely by the occurrence of infection in the plantbed. The pathogen may overwinter on seed, on plantbed cloth, in tobacco refuse, on plants which do not winterkill, and to a slight extent in soil, especially where refuse from the tobacco crop remains on the surface over winter. Severity of infection is modified by rainfall and host nutrition. Rainfall is the chief agency of dissemination and excessive rainfall predisposes the plant to infection by inducing a vigorous, succulent growth. Host nutrition as modified by fertilizers or topping determines severity of infection to a marked degree. Hence, those plants which make the most rapid, succulent, vigorous growth are most subject to severe injury. Contrary to popular belief deficiency in important fertilizer constituents does not predispose plants to severe infection. Apparently all varieties of tobacco grown in Virginia are sufficiently susceptible so that relief through choice of varieties or selection of resistant strains does not seem probable. Complete disinfection of naturally contaminated seed was obtained with a 15-minute soaking in 1:16 formaldehyde and also with a 10-minute soaking in 1:1000 mercuric chloride. The latter material is preferred because of lack of seed injury. Seed disinfection should be accompanied by plantbed and field sanitation.—F. D. Fromme.

2619. HIGGINS, B. B. The bacterial spot of pepper. Phytopathology 12: 501-516. Pl. 31-32, fig. 1-5. 1922.—The leaves, stems, and fruits of *Capsicum annuum* L. are attacked by a species of *Bacterium*. On the leaves small, pimple-like swellings appear after an incubation period of 10-15 days. These swollen areas soon collapse and die, forming small, circular spots. On stems and fruits small, wart-like lesions are produced. The causal organism is left undetermined. It is very similar to *B. vesicatorium* Doidge and *B. crinitum* Gardner and Hendrick, which cause similar diseases of tomatoes; but it appears to differ from published descriptions of these 2 organisms in certain physiological reactions. The bacteria are carried on the surface of the seed from diseased pods. Seed treatment gives promise of controlling the disease.—B. B. Higgins.

2620. JONES, S. G. A bacterial disease of turnip (*Brassica napus*). Jour. Agric. Sci. 12: 292-305. Pl. 3. 1922.—A disease of root crops in North Wales was found to be prone to appear on soils which had been limed or heavily treated with nitrogenous fertilizers. Casual exami-

nation of a crop of white turnips did not reveal unusual symptoms but closer examination showed the destruction of the young tender leaves of the crown and a flask-shaped, soft, putrid core surrounded by a brown zone abutting on the healthy tissue. In many cases several secondary crowns had taken the place of the original destroyed crown. Farmers reported that earlier stages were seen when the foliage was apparently dead, and that recovery later took place. A rod-shaped organism $1.3-3 \times 0.75-0.9 \mu$ with a single polar flagellum was regularly associated with the disease and its pathogenicity was established by appropriate inoculation experiments. The organism was found capable of producing a soft rot in swede, potato, carrot, radish, and cabbage, but no growth occurred on beetroot. Pectinase and diastatic and peptonizing ferments are produced and the medium in which the organism has grown is capable of disintegrating turnip tissue. While the organism has many characters in common with *Pseudomonas campestris* Smith and *Bacillus Oleracea* Harrison, it is clearly more nearly related to *Pseudomonas destructans* Potter and is considered by the author to be a varietal form of the latter.—V. H. Young.

2621. MEIER, F. C., and G. K. K. LINK. Bacterial spot of cucumbers. U. S. Dept. Agric. Dept. Circ. 234. 5 p., 1 pl. 1922.—This is a popular discussion of the disease caused by *Bacterium lachrymans* Smith & Bryan. The symptoms, nature of losses, geographic occurrence, environmental influences, and control are treated.—L. R. Hesler.

2622. OLSON, GEORGE A. Agricultural gypsum for control of potato scab. Potato Mag. 53: 7, 23. 1 fig. 1922.—Application of 800-1,000 pounds per acre at plowing time has eliminated scab (*Actinomyces chromogenus*) and increased the yield rate in California.—Donald Folsom.

2623. SNOW, LAETITIA M. A new host for the fire blight organism, *Bacillus amylovorus*. Phytopathology 12: 517-524. 1922.—Bacteria were isolated from blighted twigs of the flowering plum (*Prunus triloba* var. *plena*). Cultures from 2 such isolations were compared with a stock culture of the fire blight organism (*Bacillus amylovorus*) and with 1 isolated from blighted crab apple twigs. The cultures showed minor differences in physiological reactions and in pathogenicity; but in general they agreed with published descriptions of *B. amylovorus*. A rather extensive historical discussion and a bibliography are given.—B. B. Higgins.

2624. WOLF, F. A. Wildfire of tobacco. North Carolina Agric. Exp. Sta. Bull. 246. 27 p., 7 fig. 1922.—This investigation is concerned with leafspot disease of tobacco called "wildfire" which was first definitely recognized in North Carolina in June, 1917. It has subsequently been found in 26 counties within the State. It is now known to occur also in Virginia, South Carolina, Georgia, Florida, Tennessee, Kentucky, Ohio, Wisconsin, Pennsylvania, Maryland, Massachusetts, Connecticut, Vermont, and in several districts in South Africa.—Wildfire appears to come suddenly and may render the crop practically worthless. It produces characteristic leaf spots of which the most constant and dependable character in all stages of development is the wide, yellowish border or halo. Seed pods are also affected.—Wildfire is a specific infection and the organism which causes it has been named *Bacterium tabacum*. This has been proved by repeated isolation from diseased tissues and by infection of healthy tobacco with the germ in pure culture. *B. tabacum* is not known to be actively parasitic on any other crop.—The disease originates in the plant-bed. Such agencies as infected seed, contaminated plant-bed covers, infested soil, and man are responsible for the introduction of wildfire into the plant-beds. It is carried to the field at time of transplanting by the use of diseased seedlings.—Moisture is essential not only for infection, but for the dissemination of the disease. Rainy weather, especially when accompanied by wind, favors the rapid spread of wildfire; new infections do not appear in dry periods. Nutritional factors also influence the progress of wildfire.—The only practical method of control centers around the growing of healthy seedlings. If the seed-beds can be kept free from disease, the fields will be free from it also. Prevention of wildfire in the plant-bed depends primarily upon the use of (1) disease-free seed or seed which has been disinfected, (2) new plant-bed cloths or sterilized old ones, and (3) new plant-beds or thoroughly fired old ones. No satisfactory means of checking the disease in the field is known.—F. A. Wolf.

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

2625. ANONYMOUS. Gulerods-Krusesyge. [Carrot "Krusesyge."] Tidsskr. Planteavl. 28: 62-64. Fig. 1-3. 1922.—This is a discussion of a disease of carrots caused by an insect, *Trioxa viridula*. Spraying with tobacco extract and petroleum emulsion has given good results.—Albert A. Hansen.

2626. ANDREWS, E. A. Some notes on attempts to produce immunity from insect attack on tea. Rept. Proc. Fourth [Pusa] Entomol. Meeting p. 56-59. Calcutta, 1921.—The author makes the following statement based on experience and observation: ". . . comparative immunity from *Helopeltis* attack not only can, but does, occur in nature. In our attempts to produce immunity, we are attempting to discover and reproduce the conditions under which this immunity occurs in nature. The conditions affecting the question are considerably complicated, but would appear to be bound up with the relative proportions of potash and phosphoric acid taken up from the soil by the plant." Analyses of leaves from bushes which in nature were throwing off the disease showed a 4 to 1 ratio of potash and phosphoric acid; the normal ratio is 2 to 1. It thus seems plain to the author that the throwing off of the insect pest is related to a distinct increase in the potash ratio. In direct experiments the only substance producing increased resistance was potash. Attempts to increase liability to attack appear to have failed. No increase in resistance followed in tests with phosphates.—"Mosquito blight" is the name commonly applied to *Helopeltis* injuries.—Frederick V. Rand.

2627. BALLARD, E. Results of investigation of bionomics of *Platyedra gossypiella* Saunders, in South India, together with some notes on *Earias insulana* and *E. fabia*. Rept. Proc. Fourth [Pusa] Entomol. Meeting p. 70-83. Calcutta, 1921.—Damage by the pink boll-worm includes (1) destruction of the seed, (2) retarded development and weakening of the lint, (3) premature opening of the boll leading to invasion by saprophytic fungi, *Nigrosporum*, and others, (4) staining of the lint both in the boll and in the gin, and (5) lowering of germination in unattacked seeds of injured bolls.—Life history studies, amount of damage caused, and control by natural enemies and artificial means are discussed.—Frederick V. Rand.

2628. DUFRÉNOY, J. Tumeurs chancreuses du pin maritime. [Stem tumors of *Pinus maritima*.] Rev. Zool. Agric. et Appl. Coloniale 21: 25-28. Fig. 11-13. 1922.—The wood tissues and medullary rays in tumors due to the injury of the cambium by larvae of *Dioryctria sylvestrella* may become infected by a sterile mycelium.—J. Dufrénoy.

2629. FEYTAUD, J. Le Doryphore. Chrysomèle nuisible à la pomme de terre. (*Leptinotarsa decemlineata* Say.) [The Colorado potato beetle.] Rev. Zool. Agric. Bordeaux 21: 121-168. Fig. 27-39. 1922.—The paper gives a description of the insect, its biology, food plants and damage done, means of dissemination, environmental conditions favorable and unfavorable to it, its distribution in America and in Europe, and its control.—Arsenicals should not be added to Bordeaux mixtures when spraying for this insect as the compound spray has a repellent action. The beetles should be poisoned but not driven away to other fields.—J. Dufrénoy.

2630. FRANÇA, CARLOS. Encore quelques considérations sur la flagellose des Euphorbes. [Some further observations on flagellosis of *Euphorbia*.] Bull. Soc. Path. Exotique 15: 166-168. 1922.—The writer maintains his previous position that *Stenocephalus* is the primary host of *Leptomonas davidi*, the complete proof of which has been doubted by Franchini. He bases his claim on the fact that he has followed the developmental stages of the flagellate in this host. He has been able to see *Stenocephalus*, coming from its hibernation in April and possessing the small salivary forms, easily infect *Euphorbia*, while infection by means of the latex, itself abundantly parasitized, more frequently fails. His position is further strengthened by the coincidence in Switzerland of infection of *Euphorbia* and infected *Stenocephalus* reported by Galli-Valerio.—The writer mentions as well the analogy between the developmental cycles of *Leptomonas donovani*, discovered by Mrs. Helen Adie in the insect *Cimex*

lectularius, in India, and *Leptomonas davidi* Lafont in *Stenocephalus*. The former is a case of the alternate hosts, Hemiptera and vertebrate; the latter, of Hemiptera and phanerogam. The developmental stages of the parasite are practically the same. Attention is called to the appearance of small local lesions at points of inoculation in both cases, the former in connection with the disease Kala-Azar, and the latter with the flagellosis of Euphorbiaceae. [See also Bot. Absts. 12, Entry 2634.]-G. H. Godfrey.

2631. FRANCHINI, G. Amibes et autres protozoaires de plantes à latex du Muséum de Paris (Note préliminaire). [Amoebae and other protozoa of latex bearing plants at the Paris Museum.] Bull. Soc. Path. Exotique 15: 197-203. 1922.—The writer has pursued his work on the organisms of latex-bearing plants and reports several new Euphorbiaceous hosts, as follows: *Elaeophorbium drupifera* and *Euphorbia calyculata* carried trypanosomes similar to those reported in *E. nereifolia* and *E. virosa*, except that they are smaller and the blepharoplast is more often round instead of rod shaped. Some rare forms with 2 nuclei seemed to be in process of division, and some "U" forms were observed. The latex of *E. calyculata* is less thick than that of the others and this permitted the better observation of amoeboid movements. *Excoccaria emarginata* carried a trypanosome that was generally larger than the others, measuring $10-15 \times 3.5-4 \mu$, with several masses of chromatin in the protoplasm. The flagella were not observed clearly. Degeneration forms were seen. Amoebae were observed among the trypanosomes in all 3 species. In *Euphorbia verticillata* there were no trypanosomes but amoebae alone, which were round, and $10-12 \mu$ in diameter. *Manihot dichotoma* harbored small parasites similar to *Leishmania*. The examination of 8 other *Euphorbia* species gave negative results.—In the family Apocynaceae about 30 species were examined. Amoebae were abundant especially in 4 species of *Strophantus*, and in *Acokanthera*, *Thevetia*, and *Cerbera Odollam*. *Herpetomonas* was found in the last, along with the amoebae. In the amoebae of the Apocynaceae, the protoplasm is thick and sometimes the ectoplasm is well differentiated from the endoplasm. The nuclei vary in number from 1 to 8 or more. The amoebae measured from 6 to 20μ in diameter, or if oval, $15-25 \times 6-10 \mu$. *Caudranium javanensis* harbored very numerous protozoa with accentuated amoeboid movements. They had the appearance of large trypanosomes without flagella. Each had 1 or 2 nuclei which stained a clear blue by the Giemsa method, and a curved centrosome staining very dark. The plant was in poor condition,—yellow, and with very little latex.—In the Asclepiadaceae, *Chlorocodon Whitei* harbored small amoebae, and *Cryptostegia grandiflora* contained numerous amoebae of all kinds and dimensions, including typical Crithidian forms. The very large forms measured $30-40 \times 20-30 \mu$.—In the Urticaceae several plants of *Ficus* were examined and about a quarter showed amoebae with fine protoplasm. In *Ficus Benjamina* were numerous amoebae and small trypanosomes similar to those of *Euphorbia*. In *Ficus Pierrei* were numerous undetermined amoebae and other parasites. In *F. Tholloni*, which was about half dried up, amoebae and both elongate and leishmaniform parasites without flagella were found. In *F. carica*, a large tree in the open, there occurred a large amoeba which was cultured in Nöller's solid medium. It is probable that this organism overwinters within the tree, since it was found early in March.—In the Artocarpoideae, amoebae in *Antiaris toxicaria* and in *Lakoocha artocarpus* were generally large and mobile, with many vacuoles and no distinction between ectoplasm and endoplasm.—In the Sapotaceae *Labramia Bojeri*, *Tregulia Africana*, and different species of *Chrisophyllon* and *Mimusops* harbored parasites like those in the Artocarpoideae. In *Sideroxylon inerme*, along with the amoebae, were flagellates of the *Herpetomonas* type. In other species of *Mimusops* were both flagellate forms and large trypanosome-like parasites without flagella.—In the Menispermaceae *Stephania rotunda* var. *succirubra* showed small round and oval parasites. In the Anacardiaceae *Onocarpus viliensis* showed a small protozoon with 1 or several nuclei. In the Passifloraceae different species of *Carica* gave negative results.—Some of the above plants, especially the more infected, were yellowish and with little latex. Certain species of *Ficus* were in bad condition.—Bits of young branches were fixed in Brazil fluid and stained with thionin and with iron haematoxylin. In the latex vessels were round, oval, or elongate bodies with one or several nuclei, black granules in the protoplasm, and sometimes vacuoles. Some oval forms had rather long flagella. These

studies are being continued.—Culturing fresh latex of *Strophantus Rigali* and *S. scandens* on plates of Nöller's medium (blood gelatin) at 24°C., the author secured a thin grayish growth. This consisted in part of amoebae which were mobile and generally smaller than those in the latex. A transfer gave a very rich culture. Some of the organisms showed red corpuscles in different stages of digestion. Cultures were also obtained with the latex of *Antiaris toxicaria*.—Many of the organisms mentioned in the paper are as yet undescribed. The author considers it necessary to study more of the insects inhabiting the plants, and is directing his studies to certain mosquitoes and large flies (*Lucilia* and *Sarcophaga*). It is hardly possible that *Stenocephalus* (mentioned by França) exists in the conservatory of the Botanical Garden of Paris. The author notes a resemblance between the organisms reported by Adie in *Cimex lectularius* and the latex forms.—G. H. Godfrey.

2632. FRANCHINI, G. Flagellose du chou et des punaises du chou. [Flagellosis of cabbage and cabbage bugs.] Bull. Soc. Path. Exotique 15: 163-165. Fig. 1. 1922.—Cabbage-infesting insects of the family Pentatomidae, principally *Pentatoma ornatum*, *P. ornatum* var. *pectorale*, *P. oleraceum*, and *Aelia acuminata*, collected near Bologna, were examined and all but the last found to harbor in their digestive tracts and more rarely in their salivary glands the flagellates *Crithidia* and *Herpetomonas*. The feces of the insects were rich in flagellates and in leishmaniform cysts. Their larvae were also infested. A large quantity of cabbage was examined and the leaves upon which the insects were most abundant were turning yellow and dying. There was no doubt but that the insects were harmful to the plants. Diseased leaves were washed with distilled water and weak alcohol, and smears made from the expressed juice showed not infrequently the presence of flagellates of the *Herpetomonas* type. The flagella, rather long, arose in the centrosome which was generally removed from the nucleus, though sometimes adjoining it or even behind it. There were also present irregular forms, such as those minus the flagella, leishmaniform bodies, helicoidal bodies arranged in groups, small slender ones with or without centrosomes, and even encysted forms. The flagellate forms measured 7-15 or even $22 \times 1-1.5 \mu$, flagella generally very long; leishmaniform bodies, oval, $2-6 \times 1-2 \mu$, or when round $2-3 \mu$ in diameter; cysts were $2-3 \mu$ in diameter, or $2 \times 1.5 \mu$. The writer states that it was necessary to wash leaves thoroughly to rid them of superficial forms which he found undoubtedly expelled with the excreta of the insects. He was not able to find in diseased leaves the organism *Pseudomonas campestris* (Pam.) EFS associated with a similar disease called "black nerve of cabbage."—Flagellosis of the cabbage bugs is frequent, that of the cabbage much rarer. The parasite probably penetrates through insect punctures. [See also Bot. Absts. 12, Entry 2646.]-G. H. Godfrey.

2633. FRANCHINI, G. Nouvelles recherches sur les trypanosomes des Euphorbes et sur leur culture. [New researches on the trypanosomes of Euphorbias, and on their culture.] Bull. Soc. Path. Exotique 15: 299-303. 1 fig. 1922.—The author, continuing his researches on the protozoa of the latex of Euphorbiaceae and other families, enlarges upon previously mentioned facts, including the finding of very large amoeba-like forms in addition to trypanosomes in *Euphorbia nercifolia*. The trypanosomes, especially the smaller ones, were very mobile, with amoeboid movements. Cultures on plates of Nöller's medium (blood gelatin) permitted observations of all stages of development; these confirmed the previous supposition of intermediate developmental stages between the amoebae and the trypanosomes. The small amoeboid forms increase in volume, the protoplasm becomes differentiated, and as they increase in size the U shape is assumed, sometimes with a thin membrane between the 2 parts. Sometimes this thin vacuolate membrane escapes and the larger amoeboid forms appear. Thus all the different forms were observed in the culture. In some, phagocytosis of the red blood corpuscles was evident. In stained mounts from cultures all the different stages were seen. There were resting stages with large vacuoles and round or oval encysted forms. More rarely the very large trypanosomes occurred. Large forms containing numerous small trypanosomes were also seen. These have already been observed in nature and probably represent an endocellular stage of the parasite. Histological studies of sections of young branches and leaves of *Excoccaria emarginata* apparently confirm this point of view. Tryp-

anosomes occurred in the interior of the host cells, sometimes joined to the nucleus. Their development in host tissues appears quite similar to that in culture. Tube cultures were made from an undetermined *Euphorbia* by inoculating directly from the latex to the condensation liquid of Yoshida medium. Likewise, transfers from plate cultures of the organism from *Ficus carica* on Nöller's medium were made to large Yoshida tubes, good growth secured, and further transfers made. Several stages were observed in these cultures also, this being the 1st time that cultures from this host have given a trypanosome stage similar to that from the Euphorbiaceae.—*G. H. Godfrey.*

2634. FRANCHINI, G. Remarques à propos de la note de M. França sur la flagellose des Euphorbes. [Remarks in connection with the note of M. França on flagellosis of the Euphorbias.] Bull. Soc. Path. Exotique 15: 205-207. 1922.—The writer repeats that while he does not dispute the statement that in Portugal *Stenocephalus agilis* may transmit the flagellosis of Euphorbias, he does not consider the transmission of the disease to be limited to that insect. He cites the work of others in support of his contention and gives other evidence in the form of measurements of the parasites, staining reactions, etc. França's conclusion that in Switzerland the disease of the Euphorbias is transmitted by *Stenocephalus* is considered not established till further proof is available. [See also Bot. Absts. 12, Entries 2630, 2647.]—*G. H. Godfrey.*

2635. FRANCHINI, G. Sur une amibe des figuiers de plein air de la région parisienne et sa culture. [On an amoeba of figs growing in the open near Paris, and its culture.] Bull. Soc. Path. Exotique 15: 287-292. Fig. 1-3. 1922.—The parasites were very abundant in the latex, some having amoeboid movements. In preparations fixed with osmic acid, alcohol-ether, and Schaudinn or Brazil fluid, the organisms were somewhat irregular, as were the various other latex organisms previously studied. The round ones were 12-20 μ or more in diameter; the oval, 18-22 \times 12-13 μ ; more elongate forms were 22-28 \times 2-5 μ . The protoplasm was thick, and stained deeply with Giemsa or iron haematoxylin. The nucleus possessed a centriole. From 2 to 18 nuclei were observed in different individuals. The organism did not grow on ordinary culture media, but on Nöller's blood gelatin cultures developed within the medium but not on the surface. In 3 days growth was evident, and in 10-15 days the cultures were well developed, with very numerous amoebae. Frequent transfers were necessary, since the organism grew better on fresh media. In general the amoebae of the cultures were smaller than those of the latex. All stages of multiplication were found. Encysted forms appeared very early. Protoplasmic movement is abundant in culture; only rarely do pseudopodia occur. The organism does not live so well in contaminated cultures. Blocks of gelatin with good growth were fixed in Brazil fluid and imbedded in paraffin; results are not reported. Certain amoebae digested numerous red corpuscles; no ingested bacteria were observed. The organism is very resistant to cold, and overwinters in the interior of the trees. The organism possesses a flagellate stage, which recalls the previously reported transition stages between amoebae and trypanosomes in Asclepiadaceae, Apocynaceae, etc. As to the penetration of the amoebae into the latex of the figs, 2 hypotheses were advanced: (1) penetration from the soil through lesions in the bark, or even through the roots, (2) inoculation by an insect; the latter is the more probable.—*G. H. Godfrey.*

2636. FRANCHINI, G. Sur un flagelle de Lygaeide (*Crithidia oxycareni* n. sp.). [On a flagellate of the Lygaeidae (*Crithidia oxycareni* n. sp.).] Bull. Soc. Path. Exotique 15: 113-116. Fig. 1. 1922.—The insects (*Oxycarenius lavaterae*) were very numerous on a malvaceous shrub, *Althaea syriaca*. They harbored numerous flagellates of the type *Crithidia* in their digestive tubes and more rarely in their salivary glands and probosces. The activities of the organism and its flagellum are described somewhat in detail. Its protoplasm is granular; the large, roundish nucleus is generally in the middle and the blepharoplast usually some distance from it. In the membrane of 50 per cent of the flagellates, in front of the centrosome, is a clear roundish or oval, feebly colored space (vacuole?); the blepharoplast is only exceptionally placed in the middle of this space; the flagellum traverses it or passes over

the outer edge. Rhizoplasts, axostyles, or other special bodies were not observed in the protoplasm. Division is longitudinal, beginning with the flagellum, followed by the blepharoplast, and finally the nucleus. The dimensions of the elongate forms were $26-32 \times 1.5 \mu$, free flagellum $4-6 \mu$ long; of the medium forms, $17-24 \times 1-2 \mu$; of the division forms, $10-17 \times 2-3 \mu$; of the large forms without free flagellum, oval, $9 \times 5.5 \mu$, or roundish, $5-6 \mu$ in diameter; and of the small leishmaniform individuals, $2 \times 1 \mu$, or round ones, 1.5μ in diameter. Many irregularities occur. Some resemble trypanosomes but the blepharoplast is never posterior. The culture of the parasite was never very difficult, the flagellates being very numerous and almost in pure culture in certain insects. On Nöller's medium, after 12-15 days at $25-30^{\circ}\text{C}$. there appeared a light grayish scum formed of numerous flagellates mixed with bacteria. After 4 transfers, pure cultures were obtained. Stained preparations show the Crithidia forms to be smaller than when in the intestines of the insect, and less abundant; there occur a large proportion of slightly elongated, leishmaniform, round, or oval forms.—An inoculation was made into a white mouse with organisms taken directly from the digestive tract of an insect, and the mouse, which became very sick, was killed after 24 days. The parasites were to be found in the blood and in various organs.—Studies were made of the leaves, fruits, and bark of *Althaea syriaca*, and the more rounded forms of the parasite were found. Stained smears from the expressed juice of leaves and peels of the fruits likewise showed these forms. Reddish spots were noted on the leaves and bark in connection with deposits of feces of the insects, and it is considered probable that these deposits were the source of infection. The elongate or flagellate forms, less resistant to external agents, disappeared, while the roundish and encysted forms, more resistant to the action of the sun, etc., survived.—G. H. Godfrey.

2637. FRANCHINI, G. Sur un flagellé nouveau du latex de deux Apocynées. [On a new flagellate of the latex of two Apocynaceae.] Bull. Soc. Path. Exotique 15: 109-113. Fig. 1. 1922.—In 1 of 4 plants of *Funtumia* examined a protozoon was found in the latex of the trunk, the young branches, and the leaves. It was not present in the roots. Specimens were fixed with alcohol-ether, and stained by the "Giemsa" and iron haematoxylin methods. The protozoon was elongate, without flagella or with very short flagellum; nucleus, median, spherical, and often surrounded by a lightly stained, clear zone; blepharoplast, anterior; rarely a rhizoplast. The flagellum arising in the blepharoplast was usually very short, but sometimes longer than the parasite. Besides the elongate or flagellate forms there were roundish or oval forms with different dimensions, sometimes with several chromatic masses in the protoplasm. Some very much elongate division forms with 2 nuclei and 2 centrosomes occur, with a constriction in the middle and the centrosomes toward the center, near the constriction. Some large forms with pale protoplasm, several chromatic masses, and vacuoles, were probably degenerating. Others with thick walls, with nucleus and without centrosome, were encysted. Elongate forms were $7-18 \mu$ long by $1.5-2 \mu$ wide; flagella $3-15 \mu$ long. Small roundish forms were $3-4.5 \mu$ in diameter, or $5 \times 4-4.5 \mu$. Large forms were $8-10 \times 5-6 \mu$, or (roundish) $5-6 \mu$ in diameter.—In addition, special cells enclosed from 2 to 3 or more forms similar to but smaller than those that were free. The cells were $7-15 \mu$ long and $4-10 \mu$ wide.—In *Thevetia nereifolia*, growing in close proximity to the *Funtumia* at Florence, Italy, a protozoon occurred which was similar to those described in the latter. The flagella were not seen, however, and the elongate forms were more rare. This plant was less parasitized than the other. It is probable that the same insect inoculated both hosts with the parasite. The protozoon probably belongs to *Herpetomonas* or a closely related genus. The 2 parasitized plants do not seem to suffer from infection, though some time earlier 2 plants died in an unexplained manner.—G. H. Godfrey.

2638. FRANCHINI, G. Sur un trypanosome du latex de deux espèces d'Euphorbe. [On a trypanosome of the latex of two species of Euphorbia.] Bull. Soc. Path. Exotique 15: 18-23. Fig. 1. 1922.—Organisms were found in the latex of 2 species of *Euphorbia* growing in the botanical garden at Florence (Italy). These organisms were sometimes round and sometimes oval or elongated, with a nucleus and granulations in the protoplasm and without flagella.

In addition, true trypanosomes and a series of other forms were found. It was not possible to study their mobility, since the latex quickly coagulated on exposure to the air. Two types of trypanosomes, large and small, were studied, the former measuring $8-10 \times 1-2 \mu$, the latter $4-8 \times 1-1.5 \mu$. The nucleus was round and generally toward the forward part of the body. The blepharoplast was posterior to the nucleus. The stages of development, shown in the figure, resemble those of *Trypanosoma Cruzi* or of *Cystotrypanosoma intestinalis*, the latter found in a fly. This trypanosome is similar to those described in a number of insects and vertebrates. It appears to be distinct, however, and is named *Trypanosoma Euphorbiae*. In connection with its transmission, a large number of insects were studied. Certain obligate phytophagous insects, which are named, found associated with the 2 species of *Euphorbia*, contained *Herpetomonas* and *Crithidia*, but no trypanosomes. França in Portugal attributes transmission of flagellosis of the Euphorbias to *Stenocephalus agilis*, since he has seen this insect on the Euphorbias and has found flagellates in its intestine, glands, and proboscis. It is probable that in Italy other insects transmit the disease. Certain non-phytophagous or only occasionally phytophagous insects such as flies and mosquitoes often deposit their feces on the leaves, stems, branches, etc. The feces are often rich in flagellates and encysted forms. Some of these forms harbored trypanosomes in addition to *Herpetomonas* and *Crithidia*.—*G. H. Godfrey*.

2639. GHOSH, C. C. **Supplementary observations on borers in sugar-cane, rice, etc.** Rept. Proc. Fourth [Pusa] Entomol. Meeting, p. 105-136. Calcutta, 1921.—A large number of species of termites, mole crickets, beetle grubs, beetles, red ants, etc., are discussed in relation to habits and life-histories, amount and character of damage caused, and control.—“Apart from their capacity to cause damage directly, the beetles and beetle grubs and in fact all the external agents of damage are responsible for probably much greater damage indirectly by affording places for entry of fungal diseases through bites on the surface of the stems.” In most cases the direct injury consists in boring into or chewing plant parts. In the case of *Pachydiplosis oryzae*, however, the larvae of this small mosquito-like fly feed inside of rice plants and cause the growth of a long, tube-like gall in place of the stem. Affected stems produce no ears.—*Frederick V. Rand*.

2640. HUSAIN, M. AFZOL, and HEM SINGH PRUTHI. **Preliminary note on winter spraying against mango hopper (*Idiocerus* spp.), vernacular name Tela.** Rept. Proc. Fourth [Pusa] Entomol. Meeting p. 148. Calcutta, 1921.—Hoppers that survive the winter move out in early spring from under the bark and cluster on the floral buds where they remain sucking the sap during the growth of the inflorescence. The nymphs, occurring in enormous numbers, are most injurious to the flowers, causing them to shrivel, brown, and finally fall. The attacked inflorescence has a blighted appearance which in severe cases can be seen from a distance. Honeydew falling on the blossoms also causes damage and renders pollination more difficult.—The flowers are too delicate to withstand spray treatment, but winter spraying in the early morning when the hoppers are sluggish will greatly reduce their numbers.—*Frederick V. Rand*.

2641. JHAVERI, T. N. **Notes on cotton wooly mite (*Eriophyes gossypii*).** Rept. Proc. Fourth [Pusa] Entomol. Meeting p. 96-97. Calcutta, 1921.—In the vernacular the disease is known as *chhasia* on account of the ash-like appearance of affected leaves. In years of drought it spreads over wide areas greatly checking the growth of the cotton plant. Affected leaves remain small and curl upward. Checking of the disease in December and January is apparently brought about by the heavy dews of winter. The mites responsible for this disease live mostly under the epidermis of the leaf and cause a dense growth of hairs on both surfaces and on the stem. At an advanced stage of the crop tiny predatory grubs of Coccinellid beetles attack the mites and greatly reduce their numbers. Artificial control is also discussed.—*Frederick V. Rand*.

2642. McCracken, Isabel, and Dorothy Egbert. California gall-making Cynipidae with descriptions of new species. Stanford Univ. Publ. Ser. Biol. Sci. 3¹: 1-70. 2 pl. 1922.—Following the 3 introductory pages on the biology of gall-making Cynipidae and of non-gall makers, or Inquilines, the authors give, under each of the 113 species discussed, a brief description of the galls produced and references to type specimens, hosts, and type localities. Where new species are considered descriptions are included. The various species and their hosts are also shown graphically in 2 tables.—*Frederick V. Rand.*

2643. McKay, M. B. Distribution of *Tylenchus dipsaci* on wild strawberry in Oregon. Preliminary report. [Abstract.] Phytopathology 12: 445-446. 1922.

2644. McWhorter, Frank P. The nature of the organism found in the Fiji galls of sugar cane. Philippine Agric. 11: 103-111. 2 pl., 2 fig. 1922.—An amoeba, for which the name *Phytamoeba sacchari* is proposed, is reported to be present in the galls of the Fiji disease of sugar cane (*Saccharum officinarum* L.). The organism is described as a small, intracellular, parasitic amoeba, capable of living in a free state in cane-juice cultures. The size is variable, seldom more than 12 μ in diameter. When the amoeba is intracellular, its pseudopodia are short, blunt, and lobose; when extracellular, in culture, the pseudopodia are lobose or pointed. The protoplasm contains granules rather uniformly distributed, with little or no differentiation of ectoplasm. Vacuoles are present, these being more or less contractile in the organism living under extracellular conditions. The nucleus is organized or distributed. When the gall becomes mature, each amoeba is transformed into a single cyst, which is a simple, rounded, smooth-walled structure. The cyst wall is firm but not brittle, and is composed of highly vacuolate material. When germinating, each cyst gradually absorbs its wall and becomes transformed into a motile amoeba. Reproduction takes place by simple fission and by gemination. In the developing galls, 1-6 amoebae may be present in each host cell; one or more are generally attached to the host nucleus. As the gall continues to develop, divisions of the amoebae accompany divisions of the host nuclei. When the gall approaches maturity, encystment of the amoebae occurs. There is no zoospore stage of the organism; also no coalescing of amoebae to form large plasmodia. Culture of the organism was extremely difficult, but fairly successful cultures were obtained by using juice from a diseased plant for making hanging-drop cultures. In the hanging drop were placed several very thin free-hand sections of galls. In such preparations the cysts germinated into active amoebae and the latter reproduced by fission. That the Fiji disease is caused by *Phytamoeba sacchari* cannot be considered demonstrated conclusively until pure cultures of the organism injected into healthy sugar-cane plants shall have produced the disease under controlled conditions. The evidence that this organism is the cause of the disease is as follows: From the time that the disease first appears, the organism in some stage or other is always present in the developing galls; it is abundant only in the galls, and it cannot be demonstrated in healthy plants.—*Sam F. Trelease.*

2645. Misra, C. S. *Oxycarenus laetus*; the dusky cotton bug. Rept. Proc. Fourth [Pusa] Entomol. Meeting p. 84-92. Calcutta, 1921.—This insect not only directly lowers the vitality of the seed and injures the lint but indirectly introduces a host of fungous and bacterial diseases which conjointly reduce the seed vitality to a minimum. Such damaged seeds are lighter in weight, somewhat discolored, and do not produce healthy and vigorous plants.—The adults and nymphs of this insect move freely about over the plant and are particularly active in the bolls, where they attack the seeds for their mucilaginous material. The seed coats in such cases show numerous fine perforations presumably made by the probosces of these bugs. Since this insect does not enter the unopened bolls its worst injuries follow attacks by the boll worm.—Details of life history are followed by an open meeting discussion.—*Frederick V. Rand.*

2646. Roubaud, E. [Flagellosis of cabbage.] Bull. Soc. Path. Exotique 15: 165. 1922.—At Vendée the writer observed this infection of bugs of cabbage 2 years ago and again last

year. Of *Pentatoma ornatum* collected in 1920 and 1921 more than 90 per cent of individuals in all stages were parasitized. Salivary infection was not seen. Infection was searched for in vain in diseased leaves and stems, even those most completely discolored by insect punctures. The author does not believe that one can really speak of flagellosis of cabbage, but rather that the weakened condition of the plants is due to the abundance of insect punctures. [See also Bot. Absts. 12, Entry 2632.]—*G. H. Godfrey.*

2647. ROUBAUD, [E.] [Flagellosis of Euphorbias.] Bull. Soc. Path. Exotique 15: 207. 1922.—The author states that he shares Franchini's opinion [see Bot. Absts. 12, Entry 2634] on the subject of the polyxenism of the flagellate *Leptomonas davidi* in Hemiptera and in Euphorbias. [See Bot. Absts. 12, Entry 2630.]—*G. H. Godfrey.*

2648. SEABRA, A. F. DE. Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. VII. Quelques observations sur le "thrips" du cacaoyer. [Some observations on thrips of cacao.] 23 p., fig. 25-32. Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1919.—*Heliothrips rubrocinctus* Giard is one of the very common species of thrips, but has been known only a few years. In St. Thomas and Principe it has been found parasitizing both avocado and cacao. The author gives its geographical distribution, the plants parasitized, some biological observations including acclimatization, oviposition, and development of larval forms, life-history, classification and description of the species, prophylaxis and control treatments, description of parasitized material used for study, and bibliography.—*Frederick V. Rand.*

2649. SEABRA, A. F. DE. Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. VIII. Sur une nouvelle espèce du genre *Mirotermes* appartenant à la faune de S. Thomé. [A new species of *Mirotermes* in St. Thomas.] 6 p., fig. 33-40. Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1919.—*Mirotermes obiectus* F. Silb. is an earth inhabiting species which builds its nest near the old trunks of trees and which seems to have a secondary agricultural importance, but is interesting from the point of view of morphology.—*Frederick V. Rand.*

2650. SEABRA, A. F. DE. Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. IX. Les cochenilles du caféier. [The cochineals of coffee.] 8 p., fig. 41-49. Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1919.—The most important of these insects from the point of view of damage caused is *Pseudococcus citri* Risso which attacks not only the leaves and buds of several plants, but also the fruits, branches, large trunks, and roots. It is to the roots that greatest injury results. The waxy flakes forming the secretion which shelters the colonies of this species occur in abundance upon the small trunks and roots of young plants. Species of *Pseudococcus* and *Dactylopus* are very difficult to combat not only on account of this natural protection but also because of their habit of entering fissures in the bark, and of going into the ground to the roots and even to decaying vegetable matter remote from the roots.—Other species discussed are *Cero-plastes* sp., *Ischnaspis filiformis*, *Orthesia insignis* Douglas, *Lecanium viride* Green, *Pseudomoni-dia trilobitiformis* Green, *Aspidiotus palmarum* Morg. & Ckll., and *A. articulatus* Morg.—*Frederick V. Rand.*

2651. SEABRA, A. F. DE. Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XI. Les grandes espèces d'insectes ravageurs des vieux arbres à S. Thomé. [The large insects destructive to old trees in St. Thomas.] 8 p., 3 pl. Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1921.—The author discusses not only the direct insect injuries but also the relation of these wounds to the entry of cryptogamic parasites. Two families of the order Coleoptera are described.—*Frederick V. Rand.*

2652. SEABRA, A. F. DE. Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XIV. Le "*Toxoptera coffeae* Nietner," à S. Thomé (*Toxoptera coffeae* Thomensis s. sp. n.) [*Toxoptera coffeae* in St. Thomas.] p. 15-18, 9 fig. Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1921.—The extremities of the branches, particularly on young plants, are attacked. This insect causes atrophy of the leaves, and the young branches are also severely injured from its depredations.—*Frederick V. Rand.*

2653. SEABRA, A. F. DE. Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XX. Note préliminaire sur la maladie vermiculaire du caféier à S. Thomé. [Preliminary note on nematode disease of coffee.] 6 p. Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1920.—The preconceived idea that the death of coffee plants in this island is due to cryptogamic parasites of the roots has retarded investigations. It is true that roots of the coffee plant as well as those of cacao, avocado, and other trees will, when left for several days in the field, show a whitish mycelium usually resembling the *Rosellinia* which attacks trees and particularly the vine in Europe. However, this mycelium may belong to other fungi, especially to saprophytic forms such as the *Agaricaceae*, etc. It is necessary to determine the species before pronouncing on its possible importance to pathology.—The disease now under discussion is of another order and is due to the nematode *Heterodera* sp. A description of the symptoms, agricultural importance of the disease in St. Thomas, and suggestions for treatment are given.—*Frederick V. Rand.*

2654. SEABRA, A. F. DE. Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XXII. Le *Cosmopolites sordidus* Germ. à S. Thomé. [*Cosmopolites sordidus* in St. Thomas.] 7 p., 3 fig. Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1920.—The larvae of this insect live at the base of the trunk and in the roots of the banana tree producing numerous galleries which permit water to enter the interior of the plant. Decay produced by the development of parasitic or semi-parasitic cryptogams soon follows.—Several other insects and myriopods are mentioned.—*Frederick V. Rand.*

2655. SEABRA, A. F. DE. Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé. XXX. Encore le thrips du cacaoyer (*Heliothrips rubrocinctus* Giard.) à S. Thomé. [*Heliothrips rubrocinctus* on cacao in St. Thomas.] 5 p. Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1920.—This species is reported on *Claoxylon Molleri* Pax., *Copaifer mapane* Kirk, *Maniot utilissima* Pahlz., *Pseudospondias microcarpa* Engler, *Psidium pomiferum* L., and *Urophyllum insular* Hiern. The symptoms of attack are described for each species of plant.—The use of tobacco as a trap crop is discussed, and it is stated that tobacco not only attracts the thrips but also poisons them.—Thrips are regarded as a potentially formidable enemy of the St. Thomas plantations unless serious attention is paid to a reduction of their natural multiplication.—*Frederick V. Rand.*

INFECTIOUS CHLOROSES (MOZAIC AND PEACH YELLOWS GROUPS, ETC.)

2656. ANONYMOUS. Transmission of sugar-cane mosaic by aphids. West India Committee Circ. 37. 521. 1922.—In a Porto Rico cane field 2 large insect-proof cages were erected, each containing 48 plants of a particularly susceptible variety; one half the plants in each cage were diseased, the other half healthy. Aphids were introduced into cage A, while cage B was kept free from weeds and insects. In 3 months 15 of the 24 healthy cane plants in cage A had contracted the disease while in cage B, the healthy plants showed no sign of infection.—*H. N. Vinall.*

2657. HARREVELD, PH. VAN. Gelestrepenziekte. [Yellow-stripe disease (mosaic).] Arch. Suikerindust. Nederland.-Indië 30: 362-364. 1922.—This article is a discussion and refutation of some of F. Ledeboer's remarks [see Bot. Absts. 12, Entry 2661] in regard to van Harreveld's note on stripe disease [Arch. Suikerindust. Nederland.-Indië 30: 261-262. 1922]. He repeats that the methods used for control do not have to be changed to any extent. Control

measures were selection of healthy plants in young bibit-gardens and eradication of stripe-diseased plants. Naturally bibit-gardens are kept clear from grasses and weeds from a cultural point of view. Corn and grass are too generally present to make the killing or the exclusion of corn aphids possible.—Strains of cane D. I. 52 and the Chunnee crosses, P. O. J. Nos. 36, 826, 979, 1499, 1507, 1547, and 2379, sometimes become suddenly more than 50 per cent diseased.—In general old methods of control have more value since the discovery that insects can transmit the disease from plant to plant.—*Peter J. Klaphaak.*

2658. JOHNSON, JAMES. The relation of air temperature to the mosaic disease of potatoes and other plants. *Phytopathology* 12: 438-440. *Fig. 1.* 1922.—The optimum temperature for the development of potato (*Solanum tuberosum*) mosaic lies between 14 and 18°C. Above 20°C. the mosaic symptoms gradually disappear from diseased plants. At a temperature of 24-25°C. the symptoms disappear entirely in 1-2 weeks.—*B. B. Higgins.*

2659. K[UYPER?], J. Overbrenging van Gelestrepenziekte door insecten. [Transmission of yellow-stripe disease (mosaic) by insects.] *Arch. Suikerindust. Nederland.-Indië* 30: 357-358. 1922.—This article contains a discussion of Kunkel's paper in Hawaiian Planters Rec. 26: 1922 in which Kunkel mentioned that in confirmation of Brandes' work *Aphis adusta* (*maidis*) could transmit the disease, while *Aphis sacchari* Zehntn. could not. The former, however, was seldom found on cane, but quite often on grasses present in the cane fields. Some of the grasses mentioned by Kunkel, a few of which are susceptible to the mosaic disease, occur in Java, e.g., *Eleusine indica*, *Panicum colomun*, and *P. sanguinale*. Van der Goot found *Aphis maidis* also on *Polytrias diversiflora*.—*Peter J. Klaphaak.*

2660. LEDEBOER, F. Gelestrepenziekte. [Yellow-stripe disease (mosaic).] *Arch. Suikerindust. Nederland.-Indië* 30: 359-362. 1922.—After discussing van Harreveld's note on Gelestrepenziekte en Bladluizen [*Arch. Suikerindust. Nederland.-Indië* 30: 261. 1922] the author gives the results of investigations during 1921-1922. It was found that *Aphis sacchari* Zehntner could not transmit the disease, as was at first surmised, but that *A. adusta* Zehntner was a very active carrier, thus confirming Brandes' results. *A. adusta* was found more often than would be expected. Evidence of a real attack is very seldom found, but during the rainy season the insects are found in abundance on several grasses. From these grasses winged individuals go to the cane. *Panicum colonum* L. and *Paspalum sanguinale* Lam. are the most frequent host plants for *Aphis adusta*. Grasses in the neighborhood of stripe-diseased cane are often stripe diseased also, and serve thus not only as hosts for the insects, but also as new sources of infection when stripe-diseased cane has been eradicated.—Control measures are the eradication of stripe-diseased plants, careful weeding in and around the plantation, burying or burning the weeds, and growing of infected cane only in the lowlands where it is more easily controlled. [See also Bot. Absts. 12, Entry 2658].—*Peter J. Klaphaak.*

2661. MCCALLAN, E. A. Report of seed potato inspection. *Agric. Bull. Bermuda Dept. Agric.* 1922: 4-7. September, 1922.—The report gives comparative counts of leaf-roll and mosaic in the same stock in Bermuda and Nova Scotia for 1921-1922.—*H. H. Whetzel.*

2662. MURPHY, PAUL A. Leaf-roll and mosaic, two important diseases of the potato. *Jour. Dept. Agric. Ireland* 22: 281-284. *Fig. 1-2.* 1922.—The usual symptoms and behavior are described. Capsid bugs and jassids have been proved to transmit leaf-roll in Ireland, and there they apparently are more important in this respect than aphids. Recommended control measures are field inspection for the source of seed, early removal of diseased hills, isolated seed-plots, and avoidance of soil containing diseased tubers and of conditions favoring infestation by transmitting insects.—*Donald Folsom.*

2663. WHETZEL, H. H. The seed potato situation. *Agric. Bull. Bermuda Dept. Agric.* 1922: 2-4. September, 1922.—The Bermuda seed potato problem is presented, with special reference to leaf-roll and mosaic.—*H. H. Whetzel.*

2664. WILCOX, R. B. **Eastern blue-stem of the black raspberry.** U. S. Dept. Agric. Dept. Circ. 227. 12 p., 1 pl. 1922.—This trouble is apparently not due to a "running out" of varieties; there is no indication of a parasite of any kind, and the probabilities are that the disease is of mosaic type. There is a gradual stunting and reduction of vigor in the affected plant. The shoots become shortened, the upper leaves become curled in a peculiar fashion, and the fruit is inclined to crumble. A uniform mottling of the leaves usually accompanies the change in form. A constant symptom is the discoloration of shoots; this discoloration, an indulin blue (Ridgeway), occurs at or near the surface of the ground and upward for 2 feet or more. The blue coloration is found in the chlorophyll area of the stem. This disease differs from blue-stem in the West [U. S. A.], which shows a wilting of the leaves and a darkening of the canes. Mosaic and leaf-curl are different; in the latter the tissue arches upward in a fashion not found in eastern blue-stem. The variety Hoosier seems to be most susceptible while the Kansas seems to possess the greatest resistance. Other varieties are also susceptible. Suggestions for control are given.—*L. R. Hesler.*

PARASITIC PHANEROGAMS

2665. GRINȚESCU, IOAN. **Note sur deux Orobanches parasites des plantes cultivées et sur leur origine en Roumanie.** [Note on two Orobanches parasitic on crop-plants and their source in Rumania.] Bul. Soc. Științe Cluj 1: 136-140. 1921.—This paper deals with 2 Orobanches which cause serious injury especially in Dobrudja, namely *Phelipaea ramosa* C. A. Mey. and *Orobanche cumana* Wallr. The first parasitizes especially the roots of *Cannabis sativa*, *Nicotiana rustica*, *Solanum tuberosum*, and *S. Lycopersicum*. In the absence of cultivated plants it grows on many weeds, the most important of which are given. The typical form occurs in Rumania. It originated in the steppes of Asiatic Russia and has spread apparently with the cultivation of *Cannabis* as far as Portugal.—More interesting still is *Orobanche cumana*, which formerly was little known in Rumania. It lives especially on the roots of *Nicotiana rustica*, *Artemisia austriaca*, *Xanthium strumarium*, and *Helianthus annuus*. It has spread from its native home in the region of the Caspian Sea over Bessarabia, Dobrudja, and the plateau of Moldavia. Apparently this species is gradually spreading, following the cultivation of *Helianthus annuus*.—*M. Tiesenhausen.*

2666. LONG, W. H. **Mistletoe and smelter smoke.** Phytopathology 12: 535-536. 1922.—In an area of the woodland type which had been exposed to smoke from a copper smelter there were many junipers (*Juniperus monosperma*). Close to the smelter these trees were dead, while further away they showed varying degrees of injury. Some 50 of the living junipers were infected by mistletoe (*Phorodendron juniperinum*) all of which had evidently been dead for more than a year. The author is making a more intensive study in the hope that some practical method for control of mistletoe may be worked out.—The smoke was said to contain compounds of sulphur and arsenic.—*Lillian C. Cash.*

2667. McWHORTER, FRANK P. **Concerning the sugar cane root parasite, Aeginetia indica.** Philippine Agric. 11: 89-90. 1 pl. 1922.—S. KUSANO's work [Further studies on *Aeginetia indica*. Bull. Coll. Agric. Tokyo Imperial Univ. 8: 59-79. 1908] on this parasite is reviewed, and control measures are suggested, based on earlier work and on the author's observations in the Philippines. *Aeginetia indica* L. is found on many wild, and on a number of cultivated, grasses including maize (*Zea Mays* L.), rice (*Oryza sativa* L.), and sugar cane (*Saccharum officinarum* L.).—*Sam F. Trelease.*

NON-PARASITIC DISEASES

2668. BENNETT, J. P., and E. T. BARTHOLOMEW. **Respiration of potatoes in relation to the occurrence of blackheart in storage.** [Abstract.] Phytopathology 12: 443. 1922.

2669. HERBERT, D. A. **Bitter pit in apples: the crushed cell theory.** Phytopathology 12: 489-491. 1922.—It is here suggested, and evidence supporting the theory is discussed, that

the dead cells of the pit area are those in which starch transformation has been backward and that they have been crushed by the higher osmotic pressure of the surrounding cells.—*B. B. Higgins.*

2670. LUTMAN, B. F. Relation of structure of potato leaves to tip burn. *Potato Mag.* 51: 6, 22-23. 6 fig. 1922.

2671. REDDY, C. S., and W. E. BRENTZEL. Investigations of heat canker of flax. U. S. Dept. Agric. Bull. 1120. 18 p., 5 pl. 1922.—The heat-canker type of flax injury is of non-parasitic origin and occurs somewhat uniformly each year in the northern Great Plains area, causing marked losses. The cortex of the stem is killed at the surface of the ground and sooner or later the plants topple over. While the young cankered plants die at once, those a little older may remain alive for days or weeks, as long as the vascular systems function. Stems usually enlarge just above the injury and sometimes also just below it, resulting in a girdling of the plants at the soil line. Flax plants canker only during or immediately following very hot days and are only slightly susceptible after they are 4 inches or more high. They are somewhat protected from canker by the use of cereals as nurse crops or even by weeds, and also by shading, or by a shallow surface mulch over a firm seed bed. Killing the cortex of young plants by artificial heat produced typical heat canker. The evidence indicates that a combination of succulence and high temperature of the soil surface favors canker formaton, especially in soil compacted into a crust by rains. Thicker seeding, early sowing, and drilling the rows north and south instead of east and west are suggested as helpful in lessening the severity of canker injury.—*J. T. Buchholz.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

2672. BEZSSONOFF, N. La sterilisation partielle du sol et ses applications en phytopathologie. [The partial sterilization of soils, and its phytopathological applications.] *Bull. Soc. Path. Vég. France* 9: 169-188. 1922.—This is a review of the various papers by Russell, Henderson, Hutchinson and others. Although good results are acknowledged from the use of chloropicrine treatments of nematode-infested soils the author records the best results from the use of a mixture of calcium sulphide with naphthalene to which fertilizing materials (phosphate and potash) are added. From experiments by Rivière and Pichard, Lowett, and Paillet the use of sodium arsenite, and possibly also of calcium arsenite, at the rate of 40 gm. per square m. is suggested. Sodium cyanide also should prove an efficient and cheap disinfectant. In the experiments of Truffaut cymene (paramethyl-isopropyl-benzene) at the rate of 100 gm. per square m. greatly increased the yields of treated soils.—*J. Dufrénoy.*

2673. CASTELLA, F. DE. Bordeaux mixture. Should it be acid or alkaline? *Jour. Dept. Agric. Victoria* 18: 749-754. 1920.—The author gives a brief résumé of the history of Bordeaux mixture and its chemical nature followed by a review of recent investigations published by Jean Chauzit in *La Revue de Viticulture* for May and June. The results show that Bordeaux is effective regardless of its chemical composition, but that alkaline mixtures retain their effectiveness for a longer time, especially in rainy weather.—*Wm. E. Lawrence.*

2674. DAVIS, W. H. Staining germinating spores. *Phytopathology* 12: 492-494. 1922.—Detailed directions for staining germinating spores of fungi are given.—*B. B. Higgins.*

2675. DUFRÉNOY, J. Engrais et poisons des plantes. Desinfection des sols. [Substances nutrient or toxic to plants. Soil disinfection.] *Bull. Soc. Path. Vég. France* 9: 223-224. 1922.—Various species of phanerogams are unequally tolerant of metallic ions and react differently to the presence of metallic ores in the ground, or to the addition of disinfectants to the soil.—*J. Dufrénoy.*

2676. FROMME, F. D. Experiments in spraying and dusting tomatoes. *Virginia Agric. Exp. Sta. Bull.* 230. 15 p., 4 fig. 1922.—Satisfactory control of leaf-blight (*Septoria Lyc-*

persici) was obtained in 7 separate tests in Virginia with soap Bordeaux (4 pounds copper sulphate, 2 of resin fish-oil soap, 3 of quick lime, 50 gallons water). The increase in bushels per acre on plats sprayed with this material ranged from 34 to 125 and the percentage increase from 37 to 107. The number of applications ranged from 2 to 5. Greater yields were obtained with a 3 by 4 spacing of plants than with a 4 by 5 spacing. Soap Bordeaux also gave excellent control of bacterial soft rot (*Bacillus* sp.) the percentage of control based on the check plat being 68 while that of standard Bordeaux was 36. Seven applications of copper-lime dust gave satisfactory control of late-blight (*Phytophthora infestans*) the increase in ripe fruit being 72.7 per cent and the decrease in unsound fruit 69 per cent. The percentage of unsound fruits in the dusted plats ranged from 14 to 27.3 (average 18.3) and that of the check plats from 45.9 to 75.2 (average 55.4). The practicability of spraying or dusting must be determined locally and varies according to market value of the product, cost of material and application, and severity of disease.—*F. D. Fromme*.

2677. K[UYPER?], J. Colloidale Zwavel als middel tegen plantenziekten en witte luis. [Colloidal sulphur as control measure against plant diseases and woolly aphids.] Arch. Suiker-indust. Nederland.- Indië 30: 671. 1922.—The author discusses a preparation, brought into the trade by the factory "De Haën" in Hanover (Germany), which consists of sulphur that can be made into a colloidal solution with water for spraying. Some experiments were made with Dutch material against white woolly aphids, an extreme attack of which occurred during the harvest of 1921-1922. A solution of 1-2 per cent, gave good results and killed the lice without burning the leaves.—*Peter J. Klaphaak*.

2678. MACMILLAN, H. G. Influence of the meteorological factors on potato disease and production in Colorado. [Abstract.] Phytopathology 12: 445. 1922.

2679. MANGIN, L. La lutte contre les ennemis des végétaux. (1). [Fighting plant pests.] Bull. Soc. Path. Vég. France 9: 213-220. 1922.—The importance of biological researches on both host and parasite, in order to know how and when to apply control treatments, is emphasized by reference to the researches of Cazeaux, Cazalet and Capus, and Ravaz on mildew, and to the work of American entomologists on the boll-weevil.—The use of entomophagous insects is advocated from the results obtained by Marchal with *Novius cardinalis*, by Berlese with *Prospatella Berlesi*, and by Howard with *Calosoma sycophante*.—The ideal of modern plant pathologists is prophesied to lie in the selection of disease-resistant varieties such as those obtained by Planchon, Millardet, and Ravaz and Viala for mildew-resistant *Vitis*; and by American geneticists for the rust-resistant wheats and *Fusarium*-resistant plants.—*J. Dufrénoy*.

2680. MEINECKE, E. P. Pathology of quaking aspen in Utah in relation to regulation. [Abstract.] Phytopathology 12: 446. 1922.

2681. MELCHERS, L. E. Plant diseases heretofore unreported in Kansas. Trans. Kansas Acad. Sci. 30: 196-197. 1919/21 [1922].—A list of plant diseases was reported in 1914, including 8 diseases or disease-host relations new to science: *Heterodera radicolica* on Canada thistle, Madagascar periwinkle, marguerite, cockscorn, phlox, and parsley; black chaff and stem disease of wheat (bacterial); *Pleosphaerulina briosiana* Pol. on alfalfa. In 1915, 9 were reported; in 1916 and 1917, 7 were reported, including the following 4 new to science: *Alternaria* on pepper, *Botrytis* on geranium, bacterial disease of lettuce in the greenhouse, and bud blight of sorghum caused by a fungus.—*F. C. Gates*.

2682. MELCHERS, L. E. Plant-disease survey report for Kansas, 1918. Trans. Kansas Acad. Sci. 30: 197-201. 1919/21 [1922].—This is an annotated list of diseases, including cereal diseases (barley, oats, rye, winter wheat, alfalfa, corn, and sorghum), vegetable diseases (bean, cucumber, beets, cabbage, celery, eggplant, potato, sweet potato), and fruit diseases (apple, blackberry, plum, raspberry, and watermelon). In general, the plant disease situa-

tion was ordinary during 1918 except for the occurrence of the new apple canker disease due to *Leptosphaeria coniothyrium*.—F. C. Gates.

2683. MÜLLER, KARL. *Rebschädlinge und ihre neuzeitliche Bekämpfung*. [Grape diseases and the latest methods for their control.] 2nd ed., enlarged, 213 p., 70 fig., 1 map. G. Braun: Karlsruhe, 1922.—The problems of the vine grower in Germany are treated under the following headings: General considerations relative to grape diseases; the Peronospora disease and its treatment; the application of sprays; the grape mildew; various diseases due to winter injury, soil conditions, and fungi; injury due to *Conchylis ambiguella*; other diseases caused by animals; the grape *Phylloxera*, its spread and control; the cultivation of vines resistant to *Phylloxera*; and the development of new varieties.—Lillian C. Cash.

2684. NIXON, E. L. *Profitable potato spraying*. Potato Mag. 4¹⁰: 5-6, 13, 19. 5 fig. 1922.—In 4 years, 1918-1921, 876 demonstrations in 57 counties of Pennsylvania showed an average increase of 56.7 bushels per acre, an increase of 36.7 per cent.—Donald Folsom.

2685. ORTON, W. A., and F. C. MEIER. *Diseases of watermelons*. U. S. Dept. Agric. Farmers Bull. 1277. 31 p., 21 fig. 1922.

2686. PATOULLARD, N. *Études sur les maladies et les parasites du cacaoyer et d'autres plantes cultivées à S. Thomé*. XVII. Quelques parasites du cacaoyer à S. Thomé. [Some parasites of cacao-tree in St. Thomas.] 7 p., 2 fig. Sec. Tech. et Path. Vég. Companhia Agricola Ultramarina: Lisbon, 1921.—Two important diseases of the cacao-tree, under the vernacular names "gafa" and "mela," occur in St. Thomas. The former attacks the branches, the latter the fruits.—Specimens of the "gafa" disease examined bore an alga, *Cephaleuros virescens* Kunze, and the following fungi: *Nectria albiseda* and its conidial form, *Fusarium Theobromae* App. & Strunk, *Phoma Theobromae*, and *Anthromycopsis filiformis*. The last is probably saprophytic. Diseased fruits affected with "mela" bore *Colletotrichum Theobromae* App. & Strunk, *Stilbum Seabrae*, and *Nectria ochroleuca* Schw. Each fungus is briefly described.—Frederick V. Rand.

2687. PETHYBRIDGE, G. H., H. A. LAFFERTY, and J. G. RHYNEHART. *Investigations on flax diseases*. (Third report.) Jour. Dept. Agric. Ireland 22: 103-120. Fig. 1-11. 1922.—Seedling blight (*Colletotrichum linicolum* Pethybr. & Laff.) was suppressed in 1921 by drought. Browning and stem-break, diseases due to *Polyspora Lini* Laff., were less prevalent than usual. The fungus was disseminated from lower to higher leaves by flax flea-beetles, and was not controlled by spraying with 2 per cent Bordeaux mixture or by seed treatments with copper sulphate, lime, and formaldehyde. The diseases rust and firing are due to *Melampsora Lini*. The teleutospores remain infective after 21 months in a dry place; a biologic race on *Linum catharticum* does not infect cultivated flax. *Thielavia basicola* (B. and Br.) Zopf., proved by inoculations to be the pathogen of root-rot, was also found in the weeds *Senecio vulgaris* and *Chenopodium album*. Flax-droop (no pathogen found) was the result of fiber degeneration in plants of tall-growing pure lines. The pathogen of the Sclerotium disease (*Sclerotinia sclerotiorum* Mass. = *Sclerotinia Libertiana* Fuck.) was cross-inoculated successfully to potato. Alleged frost injury is probably mostly seedling-blight injury. Insect pests are discussed.—Donald Folsom.

2688. RAMSAY, A. A. *The preparation of colloidal sulphur*. Agric. Gaz. New South Wales 33: 819-823. 1922.—It is practicable to prepare colloidal sulphur on the farm from home-made lime-sulphur mixtures at $\frac{1}{4}$ - $\frac{1}{2}$ the cost of proprietary colloidal sulphur preparations. Results of experiments and analyses are given together with methods of preparation and estimates of cost. Each gallon of lime-sulphur mixture was found to yield about 1.25 pounds of colloidal sulphur.—L. R. Waldron.

2689. [SCHOENE, W. J.] General rules governing the certification of sweet potatoes. Quart. Bull. Virginia State Crop Pest Commission 4: 4 p. 1923.—The rules apply in Virginia and include methods of bedding for certification.—F. D. Fromme.

2690. [SCHOENE, W. J.] Progress report cedar rust eradication. Quart. Bull. Virginia State Crop Pest Commission 4: 4 p. 1922.—Recent progress of cedar eradication as a measure of protection for apple orchards in certain counties in Virginia is discussed. During the period from December 15, 1921, to July 1, 1922, there were 127 petitions filed with the State Entomologist involving an area of 12,721 acres.—Data are also given on crown gall inspection work.—F. D. Fromme.

2691. SEABRA, AMANDO DE. Estudos sobre as doenças e parasitas do cacauero e de outras plantas cultivadas em S. Tomé. XVIII. A moléstia nova dos cacaueros na Ilha de S. Tomé. [The new disease of cacao trees on the Island of St. Thomas.] 43 p. Sec. Téc. e Patol. Veg. Companhia Agricola Ultramarina: Lisbon, 1919.—The disease attacks the pods of cacao trees and is caused by *Heliothrips rubrocinctus* Giard., and *Lasiodiplodia Theobromae*.—The insect multiplies rapidly during the dry season and causes first a rusting and change of color of the capsules which resembles the scab of Brazil and Trinidad. This is followed by leaf injury and slow defoliation. During the following rainy season the fungus enters through neglected wounds or insect injuries and causes a drying and dying of ends of branches of adult trees and entirely kills the young trees under 5 years of age.—Fungous threads come to the surface on all infected parts through pores and cracks in the bark. The interior of the bark of infected areas is covered with a fungous mycelium. *Nectria* also does considerable damage and other fungous fructifications accompany those of *Lasiodiplodia*. A number of synonyms for the fungus *Lasiodiplodia Theobromae* are given.—Tobacco solution kills all insects with which it comes in contact but does not give protection against surviving insects or new colonies. Bordeaux controls the fungus. The author recommends Russel's formula for tobacco infusion and a combined treatment with tobacco and Bordeaux. The growing of tobacco as a trap crop is recommended. Infected capsules, branches, and trees should be burned.—The author considers this the most serious disease attacking cacao trees. In 1919 the total loss on St. Thomas was about 10 per cent of the annual crop.—Charlotte Elliott.

2692. SEABRA, AMANDO DE. Estudos sobre as doenças e parasitas do cacauero e de outras plantas cultivadas em S. Tomé. XIX. A seca dos ramos dos cacaueros. [The drying of branches of cacao trees.] 40 p. Sec. Téc. e Patol. Veg. Companhia Agricola Ultramarina: Lisbon, 1919.—Drying and subsequent defoliation may be due to drought or to strong winds. A. Drying due to plant parasites. "Gafa" or drying of the ends of branches is an annual disease becoming serious only during periods of great humidity or high temperature. It attacks trees of all ages especially those overcrowded. The initial infection is due to *Lasiodiplodia Theobromae*, which can attack uninjured branches. *Nectria* and *Corticium* are commonly associated with it and also *Macrophoma*, *Fusarium*, *Melanoma Henriquesianum*, and an alga, *Cephaleurus virescens*. Disinfection of wounds, pruning and burning of infected branches, and application of Bordeaux control this disease. (2) Sudden death. This is not a nutritional disease but is due to a severe attack of *Lasiodiplodia Theobromae*. The leaves begin to turn yellow in a day, the yellowing becomes more intense and in a few days the whole tree is dry and sapless, the leaves and fruits adhering to the branches for some time. The bark becomes suberized and thickened and through interference with its normal functioning death of the tree results. Plants 4-8 years old and those less resistant to unfavorable climatic conditions are more often attacked. Curative treatments are ineffective. Careful cultural methods greatly lessen infection. (3) Rotting of the base of trunk and roots. *Lasiodiplodia Theobromae* causes the initial infection. *Corticium* and *Nectria* are almost constantly associated with the disease, and *Colmariaecae*, *Pleonectria*, and higher forms are also found. It attacks plants of all ages, and unlike "Gafa," which disappears with change of climatic conditions, this decay of trunk and roots continually increases until the tree is killed. Lesions first appear as dark areas on the bark from 1-2 feet above the crown down to the exposed

roots. The bark is thickened and as the disease progresses becomes loosened, disclosing a thick layer of white mycelium. Later the bark splits longitudinally and the wood radially, the mycelial layer covering the cracks. The base of the trunk and roots appear much enlarged and saturated with moisture. If treated in the early stages this disease can be entirely overcome. Diseased bark and wood should be cut out and exposed surfaces disinfected with a concentrated solution of sulphate of iron. New soil should be placed around the roots.—The author thinks these 3 diseases are only more or less complicated stages due to the same parasite.—B. Drying due to insects. (1) *Cochonilla* (*Aspidiotos trilobitiformis* Green or *Pseudaonidia trilobitiformis* Green) attacks the leaves causing yellowing and defoliation. Various insecticides were tried but none proved as effective as the fungus *Microcera cocophila* in destroying the insects. (2) *Neotermes Gestri* enters the branches of old trees through wounds, destroys the subcortical layer, working from upper to lower branches by means of galleries until the whole trunk is destroyed. Darkening of branches, exudate, and accumulations of woody detritus mark the locations of nests, which should be cut off and burned. (3) *Heliothrips rubrocinctus* attacks leaves and capsules. The greatest injury, however, is indirect, the defoliation and weakening of the trees facilitating the entrance of *Lasiodiplodia Theobromae*. (4) Borers of the genus *Zeuzera* attack branches of plants not receiving proper care.—Charlotte Elliott.

2693. SEABRA, A. F. DE. Estudos sôbre as doenças e parasitas do cacauero e de outras plantas cultivadas em S. Tomé. XXIX. Notas sôbre as principais formas de animais e plantas interessando a agricultura de S. Tomé e particularmente a cultura do cacau.) [Notes on the principal animals and plants of interest to the agriculture of St. Thomas.] 13 p. Sec. Téc. e Patol. Veg. Companhia Agricola Ultramarina: Lisbon, 1919.—This is a list of fungi, insects, and higher animals and the plants to which they are beneficial or injurious on the Island of St. Thomas.—Charlotte Elliott.

2694. SMITH, LOREN B., and H. H. ZIMMERLEY. Relation of pressure to effectiveness in spraying tomatoes. Virginia Truck Exp. Sta. Bull. 33/34. 163-190, fig. 26-34. 1920.—It is estimated that early-tomato growers in the region of Norfolk, Virginia, lose annually 20-25 per cent of the crop through the tomato fruit worm (*Chloridea obsoleta* Hbn.) and 25-30 per cent additional from leaf mold (caused by *Cladosporium fulvum* Cke.) and leaf spot (caused by *Septoria Lycopersici* Speg.). The following results were obtained by the Bordeaux-lead arsenate spray (4-6-50 + 2 pounds powdered lead arsenate) when applied at the pressure indicated. Seven applications of spray were made in 1919 and 5 in 1920.—The plots sprayed at 200 pounds pressure gave the largest average yield of marketable fruit, exceeding per acre the unsprayed plots by 4,603 pounds in 1919 and 6,202 pounds in 1920. Those sprayed at 140 pounds pressure outyielded the unsprayed plots by 3,323 pounds marketable fruit per acre in 1919 and 5,020 pounds in 1920. On the same basis the plots sprayed at 75 pounds pressure outyielded the unsprayed plots by 2,582 and 3,884 pounds in 1919 and 1920 respectively. In 1919 the plots sprayed at 200, 140, and 75 pounds pressure had respectively 16.25, 16.51, and 16.81 per cent of the fruit injured by fruit worms; the injury on the unsprayed plots was 25.23 per cent. In 1920 the 200, 140, and 75 pound application-pressure plots had respectively 11.70, 14.24, and 15.12 per cent of the fruit injured by worms; the unsprayed controls had 21.39 per cent. In 1919, after deducting the increase in yield due to worm control, the plots sprayed at 200, 140, and 75 pounds pressure gave average increases in yield due to fungus control of 3,025, 2,052, and 1,341 pounds of marketable fruit per acre respectively; in 1920 the corresponding increases were 4,177, 3,608, and 2,695 pounds. Copper soap spray ($\frac{1}{2}$ pound copper sulphate, 3 pounds resin fish oil soap, water to make 50 gallons) used during the same years did not give as good results as did Bordeaux.—H. A. Jones.

2695. SNAPP, O. I., W. F. TURNER, and J. W. ROBERTS. Controlling the curculio, brown-rot and scab in the peach belt of Georgia. U. S. Dept. Agric. Dept. Circ. 216. 30 p., 17 fig. 1922.—This is a discussion of the growth of the peach industry in Georgia since 1890, losses from curculio and brown-rot (*Sclerotinia cinerea* (Bon.) Schr.), relation of curculio injury to

brown-rot, orchard sanitation for curculio control, disking as a control measure, and spraying and dusting. Directions for spraying and dusting and a schedule for each are given.—*L. R. Hesler*.

2696. SOURSAC, LOUIS. Étude de quelques maladies de la laitue et des moyens de les prévenir ou de les combattre. [Some diseases of lettuce and their control.] Bull. Soc. Path. Vég. France 9: 207–213. 1922. [For an almost identical account of the *Sclerotinia* disease see also SOURSAC, LOUIS. Rev. Bot. Appl. et Agric. Coloniale 2: 562–567. 1922.]—*Sclerotinia libertiana* causes much damage in the sandy soils of southern France during moist summers. The different varieties of lettuce are not equally susceptible, the “Romaine” being practically resistant. All drooping lettuce plants should be removed. Crop rotation is also suggested.—Two physiological diseases are very briefly described: “Cabuchage” and stem-fusion.—*J. Dufrénoy*.

2697. TOLAAS, A. G. Minnesota potato certification rules. Potato Mag. 4^o: 10, 18. 1922.

2698. TOMPKINS, A. W. Potato seed certification in South Dakota. Potato Mag. 4¹²: 7, 16–17. 1922.

2699. TRUESDELL, H. W. Plant pathology in Crimea. Phytopathology 12: 533–535. 1 fig. 1922.—Notes on various diseases of fruit trees, observed by the author in Crimea, are here recorded.—*B. B. Higgins*.

2700. WHETZEL, H. H. Special report by Professor Whetzel. Agric. Bull. Bermuda Dept. Agric. 1922: 2–6. June, 1922.—This is a special report to the Bermuda Board of Agriculture on the work done during the year on the diseases and pests of Bermuda crops. It is a brief statement of the chief diseases and pests found, together with suggestions for their control. Two new diseases of lilies are referred to.—*H. H. Whetzel*.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 2256, 2264, 2265, 2352, 2365, 2374, 2381, 2384, 2390, 2423, 2429, 2433, 2438, 2463, 2479, 2719, 2754, 2762, 2819, 2820)

2701. ANONYMOUS. [Rev. of: HUMPHREY, J. Drugs in commerce: their source, preparation for the market, and description. (Pittman's Common Commodities and Industries.) *x* + 116 p., 12 pl. Sir Isaac Pitman and Sons: London, no date.] Nature 110: 7. 1922.

2702. FOY, WM. H. Tables for the microscopic identification of inorganic salts. U. S. Dept. Agric. Bull. 1108. 22 p. 1922.—The author describes the petrographic methods applied to the identification of inorganic salts. This method has great advantage in the identification of salts found in soils, fertilizers, scouring soaps, in dye manufacture, ground glass and sand in foodstuffs, incrustations and efflorescences on buildings, gas pipes, chemical precipitates, etc., and especially in inspection of drugs and similar products. Extensive tables are given showing optical properties of many inorganic salt crystals.—*J. T. Buchholz*.

2703. HOUSEMAN, PERCY A. Analysis of licorice root and licorice extract. Jour. Assoc. Official Agric. Chem. 6: 191–196. 1922.—Analytical methods are given for licorice root and extracts, with further remarks on various constituents extracted by solvents and not determined quantitatively.—*F. M. Schertz*.

2704. KINSLEY, A. T. Cocklebur poisoning in swine. Vet. Med. 17: 282–283. 1922.—A brief description is given of *Xanthium*. The burs injure the wool of sheep, and the poison-

ous young plants cause the death of swine. A short description is given of the symptoms exhibited by poisoned animals and of the lesions produced.—*C. D. Marsh.*

2705. PAMMEL, L. H. Blue vervain suspected poisonous to hogs. *Vet. Med.* 17: 385. 1922.—It is stated that blue vervain, *Verbena hastata*, is not eaten by live stock, and is not the cause of poisoning.—*C. D. Marsh.*

2706. PAMMEL, L. H. Fool's parsley. *Vet. Med.* 17: 649. 1922.—*Aethusa cynapium*, a European plant, is said to be poisonous to stock in New Mexico. Results of experiments on animals are quoted from Millsbaugh.—*C. D. Marsh.*

2707. PAMMEL, L. H. Hedge mustard. *Vet. Med.* 17: 385. 1922.—Reply to an inquiry concerning the cause of poisoning of a cow, the author states that he does not consider *Sisymbrium officinale* poisonous.—*C. D. Marsh.*

2708. PAMMEL, L. H. Is the bracken fern poisonous? *Vet. Med.* 17: 385. 1922.—Answering a correspondent, the work of Hadwen and Bruce is quoted as establishing the poisonous character of the common brake [*Pteris aquilina*].—*C. D. Marsh.*

2709. PAMMEL, L. H. Parsnip or buckeye poisoning. *Vet. Med.* 17: 387. 1922.—Explaining a case of a poisoned cow, wild parsnip, *Pastinaca sativa*, is considered not poisonous. The Ohio buckeye is poisonous under certain conditions, especially when young.—*C. D. Marsh.*

2710. PAMMEL, L. H. Sneezeweed. *Vet. Med.* 17: 387. 1922.—Sneezeweed is poisonous to cattle, sheep, and horses, the poisonous principle being principally in the flowers. The young plants are only slightly poisonous. Fatal cases exhibit spasms and convulsions.—*C. D. Marsh.*

2711. PAMMEL, L. H. Snow of the mountain. *Vet. Med.* 17: 647. 1922.—Replying to a question concerning *Euphorbia marginata*, it is stated that this plant has an acrid milky juice. The irritating and poisonous effects of several other species of *Euphorbia* are described.—*C. D. Marsh.*

2712. PAMMEL, L. H. Supposed poisonous mustards. *Vet. Med.* 17: 387. 1922.—Certain types of mustards cause bloat, but are not otherwise injurious.—*C. D. Marsh.*

2713. PAMMEL, L. H. Symptoms of wild cherry poisoning. *Vet. Med.* 17: 190-191. 1922.—Replying to a query in regard to the symptoms of poisoning by a species of *Prunus*, the author quotes Bergman, who is of the opinion that cases of poisoning are not characterized by high fever and are not the result of simple cyanide poisoning. Of 3 species investigated wild black cherry [*Prunus serotina* Ehr.] was most poisonous. Wilted leaves yield the maximum amount of prussic acid.—*C. D. Marsh.*

2714. PAMMEL, L. H. Will nightshade poison goslings? *Vet. Med.* 17: 467. 1922.—The several kinds of nightshade, *Solanum*, *Hyoscyamus*, and *Datura* are all poisonous. The author has had no experience with the effect of these on goslings.—*C. D. Marsh.*

2715. RUSSELL, G. A. The influence of methods of distillation on the commercial value of oil of American wormseed. *Jour. Amer. Pharm. Assoc.* 11: 255-262. *Fig. 1-2.* 1922.—Attention is called to the fact that if the producers of oil of American wormseed would make a change in the apparatus now in use, particularly as to size of pipe from the boiler into the retort so that sufficient steam could be driven through the apparatus to effect the completion of the distillation within 15 minutes, an oil could be secured complying with the requirements of the U. S. P. The author bases his statements upon a series of laboratory and field experiments. He also states the following conclusions: that "warming up" is bad practice; that

water should not be added to the retort but that the retorts should be drained from time to time; that the distillate received should be warm, since cooling the same causes a loss of oil.—*Anton Hogstad, Jr.*

2716. WEITS, R., et A. BOULAY. *Essai pharmacologique d'un glucoside cardiotonique extrait du Thevetia neriifolia*. [Effects of a glucoside from *Thevetia neriifolia*.] *Compt. Rend. Soc. Biol.* 87: 1105–1106. 1922.—The fruit of *Thevetia neriifolia* (*Cerbera thevetia*), indigenous to Central America but cultivated in Western Africa, yields a glucoside. Injections of 4 mgm. of this drug in dogs weighing 1 kgm. resulted in death within 1 hour through heart paralysis.—*J. Dufrénoy*.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 2238, 2241, 2249, 2251, 2307, 2310, 2320, 2324, 2374, 2405, 2412, 2444, 2492, 2504, 2507, 2512, 2514, 2529, 2538, 2545, 2552, 2571, 2596, 2613, 2620, 2659, 2677, 2678, 2680, 2681, 2684, 2702, 2792, 2827, 2829, 2831, 2873, 2885)

GENERAL

2717. ANONYMOUS. [Rev. of: MAQUENNE, L. *Précis de physiologie végétale*. (Fundamentals of plant physiology.) (Collection Payot.) 175 p. Payot et Cie.: Paris, 1922 (see Bot. Absts. 12, Entry 733).] *Nature* 110: 177. 1922.—This is considered a good elementary text.—*O. A. Stevens*.

2718. [B., W. M.] *Biochemistry*. [Rev. of: MOORE, BENJAMIN. *Biochemistry: a study of the origin, reactions and equilibria of living matter*. vii+340 p., 6 fig. Edward Arnold & Co.: London, 1921.] *Nature* 109: 639–640. 1922.

2719. MARSHALL, C. E. *Microbiology—A text-book of microorganisms general and applied*. 3rd ed., xxviii + 1043 p., 2 pl., 200 fig. P. Blakiston's Sons & Co.: Philadelphia, 1921.—In this edition the most noteworthy change has been made by the addition of 3 chapters on the physiology of microorganisms, in which the general principles of physical and biological chemistry and cell mechanism are discussed in relation to these organisms. A better arrangement has been made by regrouping the chapters on food. The discussions on fermented foods and food poisoning have been amplified. Additional material is presented on special industrial fermented products, biological products, and the control of infectious diseases.—*S. R. Warner*.

2720. MOORE, BENJAMIN. *Biochemistry: A study of the origin, reactions and equilibria of living matter*. vii+340 p., 6 fig. Edward Arnold & Co.: London, 1921.—This work deals with the physiology, or work, of living matter, rather than with its structure, and it relates both to plant and animal life. The first 2 chapters express observations and thoughts that led to the experimental work described in the next 6 chapters. Chapter I is a consideration of the properties of the energy peculiar only to living matter and of the effects of artificial chemical and physical interference, many specific examples being included. The 2nd chapter reviews the various works on photosynthesis and considers the interrelations of living matter, also the energy of light, the idea being set forth that inorganic colloids activated by radiant energy are to be regarded as a stage in the formation of the organism. The remaining 7 chapters deal with the energy and chemical transformations in living matter and the products of this living matter, with which is combined a critical study of enzymatic activity and equilibria. The chapters giving experimental work are each summarized. The bibliography at the end of the book consists of 17 titles which are references to general monographs and to the author's previous publications. [See also Bot. Absts. 12, Entry 2718].—*L. J. Klotz*.

2721. OPPENHEIMER, CARL. *Grundriss der Physiologie. Erster Teil, Biochemie. [Outline of physiology. Part I. Biochemistry.]* 476 p. Thieme: Leipzig, 1919.—The book is divided into 2 general sections. The 1st is systematic in nature and deals with the various compounds encountered in the animal body in the order of their chemical complexity, giving in handbook fashion their general characteristics and tests, but without sufficient detailed data for use in the laboratory; each natural chemical group is concluded with notes on the physiology of the group. This section also includes notes on the various animal enzymes, taking each one up separately. The 2nd section deals with the chemical physiology of the various compounds, discussing food materials, the transportation of such materials, secretion and excretion, regulations of functions, and the chemistry of tissues. The standpoint is that of the animal physiologist, plant products being mentioned only incidentally. The entire presentation tends to be extremely concise and takes for granted a considerable knowledge of organic chemistry. It constitutes a comprehensive review of the field, but is neither a handbook nor a laboratory guide.—*A. F. Camp.*

2722. TAYLOR, W. W. *The chemistry of colloids and some technical applications.* 2nd ed., 332 p. Longmans, Green & Co.: London and New York, 1921.—This edition is practically the same as the 1st. A paragraph on alcogels has been added, and some of the more recent work of Einstein, Svedberg, Oswald, and others is cited.—*H. C. Young.*

DIFFUSION, PHYSICO-CHEMICAL PHENOMENA

2723. ANONYMOUS. *Soaps and proteins.* [Rev. of: FISCHER, M. H., G. D. McLAUGHLIN, and M. O. HOOKER. *Soaps and proteins: their colloid chemistry in theory and practice.* ix + 272 p. J. Wiley and Sons: New York; Chapman and Hall: London, 1921 (see Bot. Absts. 11, Entry 2996).] *Nature* 110: 70-71. 1922.—The reviewer regards the work as unsatisfactory, criticising especially 4 alleged defects, as follows: (1) Reasoning by analogy from the properties of soaps as necessarily indicative of the behavior of proteins; (2) ignoring the work of other investigators, especially the contributions on emulsions and froths; (3) ignoring such fundamental factors as surface and interface tensions, adsorption, and film formation; (4) supporting theories by atypical experiments.—*Mildred L. Johnson.*

2724. JOYNER, REGINALD ARTHUR. *The viscosity of cellulose. Part II. The lowering of the viscosity of cellulose by various reagents.* *Jour. Chem. Soc. [London]* 121: 2395-2409. 4 fig. 1922.—The viscosity of cellulose is decreased by treatment with NaOH. The temperature coefficient for a rise of 10°C. is about 1.6. KCl is specially notable among salts in increasing the absorption of NaOH by cellulose. This effect may be due to an increase in the OH-ion concentration, to raising the potential of the OH-ion, or it may result from a specific action on cellulose. The action of dilute acids, air, oxygen, hydrogen peroxide, and sodium hypochlorite on cellulose was also studied. Sixteen gm. of oxygen reacted with about 2100-2500 gm. of cellulose. "Raw silver" is not very soluble in cuprammonium solution but becomes so after digestion with dilute NaOH, which destroys the protein matter present, permitting the solvent to attack the cellulose.—*F. E. Denny.*

2725. MCBAIN, JAMES WILLIAM, and WILLIAM JOB JENKINS. *The ultrafiltration of soap solutions: Sodium oleate and potassium laurate.* *Jour. Chem. Soc. [London]* 121: 2325-2344. 1922.—An improved type of ultrafilter, designed for pressures up to 900 pounds per square inch and with a capacity of 250 cc., is described in detail. Its use gave quantitative information on many important problems regarding the condition of soap solutions, e.g., relative amounts of crystalloid and colloid present at any time, osmotic pressure, hydration, diameters of colloidal particles and membrane pores, composition of ionic micellae, etc. Soap, e.g., sodium oleate (NaOl), in true solution behaves as a crystalloid; but with increasing concentration increasing amounts of simple molecules (NaOl) become aggregated into neutral colloid particles (NaOl)_x; and increasing amounts of oleate ions (Ol') are aggregated without loss of electric charge to form colloidal particles known as ionic micellae (Ol')_n. It is believed that each ionic micella is formed by the union of at least 8 or 10 ions. By a suitable choice

of membrane and pressure, only crystalloid soap and its simple ions could pass through, the 2 colloidal forms, i.e., neutral colloid and ionic micella, being held back. Even the last 2 were separated by ultrafiltration. The diameters of the pores in any one collodion membrane were found to vary over a wide range. Thus, in 1 membrane 1 pore was $300\ \mu$; 2 were $150\ \mu$; 3, $90\ \mu$; 6, $75\ \mu$; 8, $60\ \mu$.—F. E. Denny.

2726. RUTTNER, FRANZ. Das electrolytische Leitvermögen verdünnter Lösungen unter dem Einflusse submerser Gewächse. I. [Electrolytic conductivity of dilute solutions as influenced by submerged plants.] Sitzungsber. Akad. Wiss. Wien [Math.-Naturwiss. Kl.] Abt. I. 130: 71-108. 3 fig. 1921 [1922].—*Elodea canadensis* was grown in distilled and sea water, and in various dilute solutions, such as CaNO_3 and $\text{Ca}(\text{HCO}_3)_2$, and the absorption of ions in light and darkness was followed by the electrical conductivity method. From experimental data giving the resistance in ohms, the conductivity is expressed in reciprocal ohms, and since in dilute solutions such as here employed the ratio of electrical conductivity to equivalent concentration is nearly constant, the ion changes may be expressed in terms of concentrations.—With plants growing in sea water a rhythmic rise and fall of conductivity was observed in the solution. With the advent of daylight the conductivity fell slightly for about an hour, then increased rapidly to a maximum about 3 hours after noon, following which it fell again to a minimum in the early evening; during the night a slow increase again took place. These changes are related to the breaking down of dissolved $\text{Ca}(\text{HCO}_3)_2$, in which sea water is rich, and the use of CO_2 in assimilation; as a result CaCO_3 is precipitated from solution, and the conductivity falls. During intensive assimilation CaCO_3 is further broken down by continual removal of HCO_3 ions, which are absorbed by the plant more rapidly than Ca ions. As a result CaCO_3 is partly converted into $\text{Ca}(\text{OH})_2$. This change is indicated also by the development of marked alkalinity in the solution during daylight, as shown by phenolphthalein. The rise is due to the higher equivalent conductivity of the hydroxide than of the carbonate. There is no diffusion of electrolytes from the plant. The decrease in conductivity in late afternoon is due to the reverse process—change from hydroxide to carbonate; the subsequent increase is due to accumulation of respired CO_2 during the night.—The rise in conductivity may be utilized to determine the effectiveness for photosynthesis of different kinds of light. In red light the changes in conductivity parallel those in white and are nearly as intense; in blue light there was a slight rhythm similar to that in white, while in darkness there was only a steady rise.—By the use of a bicarbonate solution of known CaCO_3 content the changes in concentration corresponding to certain conductivity values were determined and from these ratios the amount of CO_2 assimilated per hour and per gm. of dry weight of plant was calculated. In one instance this amounted to 5.2 mgm. CO_2 , while 11.9 mgm. of carbonate were precipitated. When natural brook water was used, the corresponding values were 8.0 mgm. CO_2 and 18.1 mgm. CaCO_3 . This would amount to the deposition of about 2 kgm. of chalk by an *Elodea* colony, the green weight of which is 100 kgm., each day of 10 hours of sunlight. The importance of this process in building up carbonate deposits is pointed out.—F. Weiss.

WATER RELATIONS

2727. FRITSCH, F. E. The moisture relations of terrestrial algae. I. Some general observations and experiments. Ann. Botany 36: 1-20. 2 fig. 1922.—The author is concerned with the problem of how subaerial algae are enabled without any special modification to often withstand prolonged periods of drought and to revive with astonishing rapidity when moisture conditions prevail. The amount of water absorbed by the algae *Pleurococcus Naegeli*, *Hormidium*, and *Zygnema ericetorum*, when moistened, is compared with that taken up by purely aquatic algae, such as *Spirogyra* and *Cladophora*, and also with cotton wool and soil. It was found that *Pleurococcus* absorbs even less water than soil, and that the aquatic algae take up more than the other 2 terrestrial algae studied. If then allowed to become air-dry, *Pleurococcus* reaches the dry state before either *Hormidium* or *Zygnema*. *Pleurococcus* is extremely sensitive to changes in the moisture content of the air, attributed by Fritsch to the power of its cell-wall to absorb readily any atmospheric moisture. The ter-

restrial algae have no conspicuous vacuoles. If allowed to dry under observation, *Pleurococcus* shows very little contraction, but *Hormidium* and *Zygnema* shrink appreciably. It is noteworthy that in *Hormidium* the cell-wall on drying falls into longitudinal striations observable in the fresh, moist filaments. In contrast with many really aquatic algae, the protoplast in the terrestrial algae examined does not shrink away from the wall when the cells dry in the air, a provision presumably important in the rapid transference of moisture, when in contact therewith, from the cell-wall to the protoplast. The osmotic pressure of the cell-sap of these algae was found to be considerable, and there is a striking correlation between the osmotic pressure and rate of drying; likewise the notable retention of moisture by the air-dry algae is related to the concentration of the sap.—*Nellie A. Carter*.

2728. KNIGHT, R. C. Further observations on the transpiration stomata, leaf water-content, and wilting of plants. *Ann. Botany* 36: 361-385. 1922.—By means of a modified recording potometer it was found that shortly before wilting there occurred a sudden increase in the stomatal aperture, amounting to as much as 40 per cent of its previous magnitude, which increase was accompanied by a simultaneous increase in the rate of transpiration. Wilting occurred when the water content of the leaves had decreased approximately 1 per cent. The water-content of leaves of different ages varied greatly. Diurnal changes of leaf water-content of the plants used in the experiments varied less than 2 per cent.—*Lionel E. Tisdale*.

2729. YOCUM, L. E., and A. L. BAKKE. Comparison of absorption occurring in corn stalk tissue and in prepared biocolloids. *Proc. Iowa Acad. Sci.* 27: 123-127. *Fig. 25.* 1920.—Masses of tissue cut from vigorous corn stalks and dried were compared with dried agar jelly and agar with 0.05 per cent of egg albumen. Rate and amount of absorption of fluids and increase in thickness and weight were measured. The curves for the 3 substances are very similar, but the values for the corn tissue are all much smaller than those for the other colloids.—*H. S. Conard*.

MINERAL NUTRIENTS (SALT RELATIONS)

2730. DUFRÉNOY, JEAN. The biological significance of selective adsorption. *Amer. Midland Nat.* 6: 159-165. 1920.—Base-adsorbent colloids are found in the cell walls and in most of the granules of the cytoplasm. Nucleoplasm is generally acid-adsorbent except in pathological cases, where it may become base-adsorbent. Competition for bases is constantly going on between the basophilous colloids in the plant and those in the habitat, which may result in a considerable accumulation of bases in the plant tissues with a serious loss in the habitat.—*Sister M. Ellen*.

2731. GERICKE, W. F. "Magnesia injury" of plants grown in nutrient solutions. *Bot. Gaz.* 74: 110-113. 1922.—Experiments are here reported which have a bearing on the problem of leaf tip abscission in wheat plants when in nutrient solutions containing a relatively high concentration of certain salts. It was found that the injury sustained by the seedlings when grown in a solution of potassium salts was greatest with K_2SO_4 and least with KH_2PO_4 . With calcium salts no injury whatever resulted. Excessive abscission resulted with both $Mg(NO_3)_2$ and $MgSO_4$ but none with $MgHPO_4$. Two conclusions are apparent if the injury in the above cases may be regarded as physiologically the same. (1) The lack of calcium in the nutrient media may induce the injury; this is indicated by the results with K_2SO_4 , in which case Mg was not present. (2) The presence of phosphorus tends definitely to prevent the injury, for when the phosphate ion is associated with magnesium or with potassium (and calcium absent) no injury results.—*B. W. Wells*.

2732. GERICKE, W. F. Water culture experimentation. *Science* 56: 421-422. 1922.—This paper reports experiments with wheat plants grown in a series of single-salt solutions. The set of plants that grew best was kept for 4 days in KNO_3 , 1 day in $CaSO_4$, and 1 day in $MgHPO_4$, then returned to KNO_3 , etc. The growth was as good as that of controls in the

complete balanced solution of these 3 salts. The solutions were 0.01 molecular. A trace of an iron salt was added to each solution used.—*C. J. Lyon.*

2733. HERBERT, D. A. [Rev. of: TRELEASE, SAM F., and BURTON E. LIVINGSTON. Continuous renewal of nutrient solution for plants in water-culture. *Science* 55: 483-486. 1922 (see Bot. Absts. 11, Entry 4620).] *Philippine Agric.* 11: 23. 1922.

2734. LATSHAW, W. L. Report on sulphur and phosphorus in the seeds of plants. *Jour. Assoc. Official Agric. Chem.* 6: 468-470. 1922.—The Parr peroxide bomb was used in determining the sulphur and phosphorus content of several plant materials. Results were very favorable and the method is fully described.—*F. M. Schertz.*

2735. LOEB, JACQUES. Chemical character and physiological action of the potassium ion. *Jour. Gen. Physiol.* 3: 237-245. 1920.—Data obtained from experiments with eggs of *Fundulus* and sea urchins are presented which indicate that the antagonistic behavior of the K ion in salt solutions is due not to any trace of radioactivity, but to the purely chemical character which is determined by position in the periodic system. Li and K ions which are on opposite sides of the Na ion in the periodic table seem to deviate in their physiological action in opposite directions from Na. Tolerance to Li ions in solution with Na and other salts was increased 500 per cent and more by substituting elements on the other side of Na, that is, K, Rb, and Cs, for part of the Na.—*Otis F. Curtis.*

2736. PATCHOVSKY, N. Über eine Möglichkeit des aussernormalen Entstehens von pflanzlichem Kalziumoxalat. [Artificial formation of calcium oxalate crystals in plant cells.] *Biol. Centralbl.* 39: 481-489. 1919.—Previous work of the author showed that plants in which no formation of calcium oxalate crystals takes place lack oxalic acid in the cell sap. Investigations here reported seem to prove that in such cases exposure to weak solutions of potassium oxalate of less than fatal toxicity resulted generally in a more or less pronounced formation of calcium oxalate crystals, and that the amount of crystal formation was related to the toxic effect of the oxalate solution on the plant under experiment.—Leaves of *Mniun* and *Fanaria*, of *Eloëa densa*, *Nasturtium*, and *Ceratophyllum*; moss protonema, *Vaucheria*, and *Spirogyra* were cultivated in close covered glass dishes of 30 cc. capacity. Dilutions of 1, 2, and 3 per cent of potassium oxalate in water were employed and as the experiments were performed in winter the photosynthate deficit was supplemented by a 5 per cent cane sugar solution. Specimens used showed notable differences in resistance to the toxic effect of the oxalate solution. The most resistant—moss protonema—failed to show calcium oxalate crystals. In the more sensitive *Spirogyra*, which normally exhibits crystal formation, exposure to 1 per cent potassium oxalate solution with 10 per cent cane sugar resulted in a notable increase of crystals. It is concluded that this formation of calcium oxalate crystals indicates a means by which plant cells become protected against the toxic effects of oxalic acid, in that the calcium salt of the cell sap combines with the oxalic acid to form an insoluble salt.—*William L. Bray.*

2737. PFEIFFER, TH. Über den Einfluss des Kalk-Magnesia-Verhältnisses auf das Wachstum der Pflanzen. [Influence of the calcium-magnesium ratio upon the growth of plants.] *Jour. Landw.* 69: 1-3. 1921.—This is in reply to Oskar Loew.—*F. M. Schertz.*

2738. PFOTENHAUER, CHARLOTTE, TH. PFEIFFER, und A. RIPPEL. Das Verhalten verschiedener Pflanzen schwerlöslicher Phosphaten gegenüber. [The behavior of different plants toward difficultly soluble phosphates.] *Jour. Landw.* 69: 165-183. 1920.—Plants differ physiologically and are characterized by their different powers to act upon difficultly soluble phosphates.—*F. M. Schertz.*

2739. RIPPEL, AUGUST. Untersuchungen über die Mobilisation der Aschenbestandteile und des Stickstoffs in Zweigen beim frühjährlichen Austreiben. [Investigation on the mobilisation of the ash constituents and nitrogen in twigs in spring elongation.] *Biochem.*

Zeitschr. 113: 125-144. 1921.—Rippel finds that as leaves develop in the spring, P, K, Mg, Na, and N are transported from the twigs to the leaves, while Ca, S, and Cl are not so transported. This corresponds with the transportation from the leaves into the stem in the fall. The elements so transported were found to have occurred almost exclusively in the twigs in organic combinations. When the twigs were placed in nutrient solutions lacking 1 essential element at a time it was found that the element lacking in the nutrient solution was dissolved and transported to a greater extent than when the twigs were placed in distilled water. This was true of all elements transported. The lack of carbohydrates was not reached as soon as the lack of mineral salts. Due to the inability of the twigs to transport calcium, the leaves suffered in their development in the same way that seedlings without calcium suffer.—*F. G. Gustafson.*

2740. TURNER, THOMAS WYATT. Studies of the mechanism of the physiological effects of certain mineral salts in altering the ratio of top growth to root growth in seed plants. *Amer. Jour. Bot.* 9: 415-445. 1922.—Previous work on the factors determining the ratio between tops and roots of plants is reviewed. Concentration of the nutrient solution has been thought to influence this ratio, but the author suggests that this result may be due instead to deficiency in one or more of the mineral nutrients. He therefore studied the effect of nitrate ions on the relative behavior of tops and roots in certain plants. In 3 nutrient solutions the concentration of nitrate salts was made low, medium, and high, respectively, the solutions being otherwise identical. With barley and corn, the ratio of tops to roots increases significantly as the nitrate concentration of the solution is increased. The actual dry weight of roots is greatest in the low nitrate solution and of tops in the high. In another set of solutions where the amount of nitrate was left as in the previous experiment, but where the total concentration of the solution less nitrate was greatly altered, essentially the same results were secured, thus indicating that nitrate concentration rather than total concentration was the determining factor in the top-root ratio. Hydrogen-ion concentration was also found to be without effect. With flax, unlike barley and corn, there was no change in the ratio as the nitrate concentration was altered. In all experiments the efficiency of the solution used, as judged by total dry weight produced, was not greatly different.—To determine the direct effect of nitrates on root growth, root tips were grown in nutrient solutions with a supply of sugar; it was found that nitrates increased root growth in all cases. The relation of dry weight to green weight was found to be materially different in certain cases, and it is pointed out that neither dry weight nor length of root is a safe measure of growth. The increased ratio of tops to roots which results from increased nitrate concentration may be due to the increased use of carbohydrates by the tops because of the greater growth there which has been stimulated by the nitrogen. This results in a decrease in the supply of carbohydrates for the roots, which may bring about an absolute or at least a relative reduction in root growth.—*E. W. Sinnott.*

PHOTOSYNTHESIS

2741. CERIGHELLI, RAOUL. Influence de l'anhydride carbonique sur le développement des plantes—emploi de CO₂ comme engrais atmospherique. [Influence of carbon dioxide upon the development of plants—the use of CO₂ as an atmospheric fertilizer.] *Ann. Sci. Agron. Française et Étrangère* 38: 68-75. 1921.—The literature on the subject is briefly reviewed, attention being drawn especially to the work of Demoussy, Brown and Escombe, Cummings and Jones, and Riedel. The author draws conclusions as follows: (1) the enrichment of the air with CO₂ considerably increases the development of plants, whether in the greenhouse or open fields; (2) the CO₂ used should be very pure or at least unmixed with toxic gases. The residual gases of furnaces may be used, and it is quite likely that the CO₂ of fermentation industries may be suitable.—More researches are necessary to put the utilization of the gas on a sound practical basis.—*A. B. Beaumont.*

2742. GAIL, FLOYD W. Photosynthesis in some of the red and brown algae as related to depth and light. *Publ. Puget Sound Biol. Sta.* 3: 177-193. 1922.—A series of experiments is

reported giving the amounts of photosynthesis in a number of red and of brown algae, using the Winkler method for the determination of the oxygen evolved. The results indicate that certain species of red algae, in nature usually deeply submerged, exhibit maximum photosynthesis at 15 m. approximately. Certain species which occur both deeply submerged and near the surface, usually somewhat different in color in the 2 habitats, have their maxima at different depths, the deeper forms at about 15 m., the shallower form at 1-8 m.—Among the brown algae the maximum photosynthesis in *Fucus evanescens* is at 1 m.; in *Costaria costata*, about 8 m., in *Desmarestia ligulata*, about 15 m.—Those algae growing 3 or more m. below the surface show maximum photosynthesis nearer the surface in cloudy weather (or under a roughened surface) than they do in clear weather and under a smooth surface. Algae growing practically at the surface show reduced amounts of photosynthesis when submerged more deeply. There seems to be a rather definite relation between the maximum photosynthesis and the habitat of species experimented upon. The lower limit at which appreciable photosynthesis takes place in both the red and the brown seaweeds in Puget Sound is about 35 m.—*T. C. Frye*.

METABOLISM (GENERAL)

2743. BODMER, HELEN. Die Reservestoffe bei einigen anemophilen Pollenarten (Vorläufige Mitteilung). [The reserve materials of certain anemophilous types of pollen. (Preliminary contribution.)] Vierteljahrsschr. Naturforsch. Ges. Zürich 66: 339-346. 1921.—This paper deals with the starch, fat, and water content of certain monocot and dicot pollen-grains, and the taking up of food materials from the substratum during the growth of the pollen-tube.—*John H. Schaffner*.

2744. CAJORI, F. A. The use of iodine in the determination of glucose, fructose, sucrose and maltose. Jour. Biol. Chem. 54: 617-627. 1922.—A method has been devised for the quantitative determination of glucose, fructose, and sucrose, where these sugars occur together and in small quantities. Results suggesting that the method may be extended to include maltose are given. It is pointed out that in applying this method to plant extracts containing other compounds in addition to the sugars the accuracy of the results will depend on the freedom of the solution analyzed from reducing substances other than sugars, or compounds that will react with iodine.—*G. B. Rigg*.

2745. COMBES, RAOUL. La formation des pigments anthocyaniques. [The formation of anthocyanic pigments.] Compt. Rend. Acad. Sci. Paris 174: 240-242. 1922.—Studies were made with leaves of *Ampelopsis hederacea*. The experiments of Jonesco, who claimed that the appearance of the red pigment was due to an oxidation process, were repeated. The author disagrees with the conclusions of Noack and of Jonesco, and claims that they did not take sufficient account of the fact that these compounds are derivatives of γ -pyrane.—*C. H. Farr*.

2746. FEHER, DANIEL. Über die Abscheidung von Harzbalsam auf den jungen Trieben unserer einheimischen Populus-Arten. [The separation of resin in young shoots of our native species of Populus.] Beih. Bot. Centralbl. I Abt. 39: 81-103. 1922.—The secretion of resin is a common occurrence in the Populus species investigated. It is found in small quantities in *P. alba*, *P. tremula*, and *P. canescens*, but in larger quantities in *P. pyramidales*, *P. balsamifera*, and *P. canadensis*.—The secretions take place in the glandular teeth of the foliage leaves, the stipules, and the bud scales. The secretion always occurs in the modified prism-shaped epidermal cells. It passes immediately to the outer surface, or it lifts the cuticle and penetrates between it and the cell membrane. The secretion is resin (Harzbalsam) and contains no gum (caoutchouc).—*L. Pace*.

2747. FORSTER, M. O. The laboratory of the living organism. Sci. Monthly 13: 301-308. 1921.—This is a summary of the address of the president of the Chemical Section of the British Association for the Advancement of Science dealing, among many purely chemical matters,

with certain bacteriological and technological advances, such as: Buchner's zymase and the later discoveries; the chemical work done by yeasts, molds, and bacteria; the mechanism for utilizing nitrogen and carbon; whether chlorophyll is protective and the result of photosynthesis, or the agent of this process; and many applications of such work.—*L. Pace.*

2748. HEYL, FREDERICK W. The phytosterols of ragweed pollen. *Jour. Amer. Chem. Soc.* 44: 2283-2286. 1922.—The following phytosterols were found in the unsaponifiable portion of the ragweed pollen: "ambrosterol," $C_{26}H_{44}O$, melting at $147-149^{\circ}C.$, a phytosterol with the formula $C_{27}H_{46}O$; also cetyl alcohol, octodecyl alcohol, and traces of hydrocarbon. There is also some evidence of a hydroxyphytosterol.—*J. M. Brannon.*

2749. HAWORTH, WALTER NORMAN, and GRACE CUMMING LEITCH. The constitution of the disaccharides. Part VI. The biose of amygdalin. *Jour. Chem. Soc. [London]* 121: 1921-1929. 1922.—The paper concerns the structural formula of amygdalin extracted from bitter almonds, and in particular the nature of the sugar associated with mandelonitrile in the glucoside.—*F. E. Denny.*

2750. HERZFELDER, HELENE. Beiträge zur Frage der Moosfärbungen. [Moss pigments.] *Beih. Bot. Centralbl. I Abt.* 38: 355-400. 1921.—The colors in mosses, like those of higher plants, are due to chromatophores and cell sap; but the most important moss coloring is due to material in the cell wall. This latter material falls into 2 groups, one giving the anthocyan reaction, the other the phlobaphene. This wall-coloring material cannot be stored food, for it could not be used. The disappearance of the color was not observed except in *Orthothecium* where there is a possibility of its further use. The blue color of *Metzgeria fruticulosa* and *M. boliviana* is post mortem.—*L. Pace.*

2751. HICKMAN, KENNETH, CLAUDE DEVEREUX and REGINALD PATRICK Linstead. A modified methyl-orange indicator. *Jour. Chem. Soc. [London]* 121: 2502-2506. 1 fig. 1922.—In titrating with methyl-orange the end-point is not sharp, but by adding "a suitable screening dye there is a period during the acidification when the amounts of red, green, and blue transmitted are visually equal, so that the solution appears white or neutral grey. The colour change is, therefore, green-neutral grey-magenta, that is, from one colour, through white, to a supplementary colour,—a change to which the eye is most sensitive." The mixed indicator recommended consists of 1 part of methyl-orange to 1.4 parts of xylene cyanole FF dissolved in 500 parts of 50 per cent alcohol. The end-point is at $p_H = 3.8$. The indicator is valuable, for example, in the estimation of mixed hydroxide and carbonate by the double end-point method. Results equal to those obtained in daylight were obtained with a 100-watt, gas-filled, "daylight" lamp with a blue glass bulb.—*F. E. Denny.*

2752. HOLBØLL, SVEND AAGE. Untersuchungen über I. Bangs Mikromethode zur Bestimmung von Traubenzucker. [Investigation on I. Bang's new micromethod of determining grape sugar.] *Biochem. Zeitschr.* 113: 200-209. 1921.—A brief description of Bang's new method for determining glucose is given. This is followed by a verification of the method through experiments in which various amounts of sugar were used. The writer finds that there is a constant relation between the amount of potassium iodate reduced and the amount of glucose, irrespective of the concentration of the glucose. This constant was found to be 0.265 cc. of 0.01 N KIO_3 per 0.1 mgm. of glucose. To calculate the amount of glucose in an unknown solution he used the following equation: $x = 2.00 - n - a \div p$, where n is the number of cc. of 0.01 N KIO_3 reduced, a the number of cc. of 0.01 N thiosulphate used to titrate the remaining KIO_3 , and p the constant (0.265). This equation gives the glucose in 0.1 mgm. amounts.—*F. G. Gustafson.*

2753. IRMIN, GUIDO. Zur Kenntnis der Stoffverteilung bei einigen Iris-Arten, besonders in ihren Blättern. [The distribution of material in some species of Iris, especially in the leaves.] *Beih. Bot. Centralbl. I Abt.* 39: 152-205. 1922.—A brief statement is made as to

papillae, bundles, chlorophyll, parenchyma, spaces, anthocyanin, starch, tannins. This is followed by records of individual investigations on leaf, rhizome, and root of *Iris biglumis*, *I. Gueldenstaediana*, *I. songarica*, *I. spuria* var. *sogdiana* and var. *notha*, *I. sibirica*, *I. ruthenica*, *I. japonica*, *I. foetidissima*, *I. versicolor*, *I. Pseudoacorus*.—Seasonal variations are described. All species investigated have tannin either diffused or in idioblasts or in both conditions in the outer and inner epidermis. Its distribution in the mesophyll, the bundles, the rhizomes, and the roots is given. As the leaf continues elongation, from March or April to July or August, the tannin content gradually increases. The idioblasts appear typically first at the base and next at the tip and spread from these 2 areas.—*L. Pace*.

2754. JACOBS, W. A., and M. HEIDELBERGER. **Strophanthin. I. Strophanthidin.** Jour. Biol. Chem. 54: 253-261. 1922.—Strophanthin is a glucoside which on hydrolysis yields a crystalline substance, strophanthidin, and reducing sugars. Strophanthidin ($C_{23}H_{47}O_6$) is a component of a number of glucosides which possess a characteristic action on the heart and occur in different plants.—*G. B. Rigg*.

2755. JAMMIESON, GEORGE S., WALTER F. BANGHAM, and DIRK H. BRAUNS. **The chemical composition of peanut oil.** Jour. Amer. Chem. Soc. 43: 1372-1382. 1921.—Two samples of peanut oil were studied, one a Spanish type grown in South Carolina and the other a Virginia type grown in Virginia. A comparison of these 2 with respect to the percentages of the different fatty acids contained in the glycerides is given below, the figure given first in each case referring to the Spanish type and the other to the Virginia type: oleic acid, 52.9 and 60.6; linolic acid, 24.7 and 21.6; palmitic acid, 8.2 and 6.3; stearic acid, 6.2 and 4.9; arachidic acid, 4.0 and 3.3; and lignoceric acid, 3.1 and 2.6 per cent. Of unsaponifiable matter there was respectively 0.2 and 0.3 per cent.—*J. M. Brannon*.

2756. KENNEDY, CORNELIA, and L. S. PALMER. **Yeast as a source of vitamine B for the growth of rats.** Jour. Biol. Chem. 54: 217-232. 1922.—The results do not support the general belief that yeast is an unusually valuable source of the growth-promoting vitamine B, or that it can be accepted as a standard product in experiments in which a vitamine B preparation is required.—*G. B. Rigg*.

2757. LIPPMAN, E. O. VON. **Einige pflanzenchemische Beobachtungen.** [Some observations on the chemistry of plants.] Ber. Deutsch. Chem. Ges. 54: 3111-3114. 1921.—The presence of mannose, succinic acid, cane sugar, and "huminstoffe" in certain plants is discussed.—*Henry Schmitz*.

2758. MACDONALD, MARGARET B. **The synthesis of water-soluble B by yeast grown in solutions of purified nutrients.** Jour. Biol. Chem. 54: 243-248. 1922.—It would seem from the results obtained by feeding 5 varieties of yeast that, so far as its content of water-soluble B is concerned, yeast grown in solutions of purified nutrients is much like yeast grown in other media. The results obtained with the 5 varieties of yeast tend to make general the conclusions reached by other workers for 1 variety, the conclusion being that yeast is capable of synthesizing water-soluble B when grown in a nutrient solution of the necessary mineral salts (including ammonium chloride) and cane sugar.—*G. B. Rigg*.

2759. MALFITANA, G., et CATOIRE. **L'amylocellulose considérée comme composé d'acide silicique et d'amylose.** [Amylocellulose considered as a compound of silicic acid and amylose.] Compt. Rend. Acad. Sci. Paris 174: 1128-1130. 1922.

2760. MAMELI, EVA. **Estudios biológicos sobre el pólen.** (Trabajo preliminar.) [Preliminary report on the study of pollen.] Mem. Soc. Cubana Hist. Nat. "Felipe Poey" 4: 45-77. 1922.—Notes are given on the composition of the pollen in 353 species from 80 families of plants. Of the species studied 63 per cent have oily pollen at maturity and the remaining 37 per cent have pollen classed as starchy.—*J. A. Faris*.

2761. MASTERS, HELEN. Reactions of cellulose with sodium chloride and other neutral salt solutions. Part I. Preliminary survey. Jour. Chem. Soc. [London] 121: 2026-2034. 1922.—Results were obtained that were not in accordance with the generally accepted belief that cellulose is without action on dilute solutions of neutral salts. Neutral sodium chloride, when passed through cotton, came out acid, the amount obtainable from 200 cc. of $\frac{N}{10}$ NaCl and 10 gm. of cotton being equivalent to about 4.0 mg. of HCl. When the cotton which had been treated with NaCl was subsequently washed with water the leachings came out alkaline, the amount of alkali obtained in this way being about equivalent to the acid resulting from the original treatment with NaCl. Purified asbestos when treated in the same way did not liberate acid or alkali. Preliminary experiments with wool gave results the reverse of those obtained with cotton. Data on salts other than NaCl are given. Further experiments are planned to give information on the nature of the changes involved in these reactions.—F. E. Denny.

2762. ORTON, C. R., E. V. MCCOLLUM, and N. SIMMONDS. Observations on the presence of the antineuritic substance, water-soluble B, in chlorophyll-free plants. Jour. Biol. Chem. 53: 1-6. 1922.—The onion root [bulb] contains a certain amount of water-soluble B. This fact is believed to warrant the conclusion that water-soluble B is not concerned with the structure of the chloroplast. The mushroom *Agaricus campestris* proved to be a good source of this vitamin. Dodder, *Cuscuta Gronovii*, proved toxic and caused the death of the experimental animals. Indian-pipe, *Monotropa uniflora*, gave inconclusive results.—G. B. Rigg.

2763. PALMER, L. S. Carotinoids and related pigments. 316 p., 2 pl. The Chemical Catalog Co., Inc.: New York, 1922.—The distribution and terminology of carotinoids are discussed in a general way. These red, orange, and yellow pigments extractable by fat solvents are found abundantly distributed in the plant world from bacteria to the highest phanerogams, in the animal world from protozoa to man. In a brief chronological review are given the results accomplished by the various workers towards determining the presence of carotinoids in phanerogams. This review is carried out under several subheads, such as carotinoids in roots, in chloroplastids, in etiolated leaves, in flowers, in fruits, in seeds and grains.—The cryptogams are abundantly characterized by these pigments, especially the algae and fungi. The study of carotinoids in bacteria is practically an unexplored field.—Some discussion is devoted to the presence of pigments in vertebrates and invertebrates. The chemical relations between carotinoids in plants and animals are given in detail. The consensus of opinion is that a chemical relation exists between plant and animal pigments, but they are not identical. The biological relation between plant and animal carotinoids is brought out by many experiments and observations contributed or cited by the author. Methods are given for the isolation of carotin from carrots, green leaves, and animal fat; for the isolation of xanthophyll from egg yolk and green leaves; also for lycopin from tomato and fucoxanthin from Phaeophyceae. General properties and methods of identification of carotinoids are explained, such as, crystallization, solubility, and spectroscopic analysis. Likewise, quantitative estimations of the various pigments are given.—The last chapter is devoted to a summation of the various theories concerning the possible functions of the carotinoids in plants and animals.—Grace E. Howard.

2764. TSCHIRCH, A. Besitzt die Pflanze Hormone? [Does the plant have hormones?] Vierteljahrsschr. Naturforsch. Ges. Zurich 66: 201-211. 1921.—The author compares plant vitamins with animal hormones and believes that vitamins play an important rôle in the plant organism. He also calls attention to such facts as the prolongation of the blooming period in orchids when pollination does not take place. Certain extracts of orchid pollen have the power to shorten the blooming period, as does pollination with living pollen, and seem to be of the nature of hormones. The accumulation and digestion of foods in storage organs, etc., may be due to the action of hormones. Hormones are of first importance as activators of enzymes. A difficulty in the comparison of the reactions in plant and animal bodies lies in the

fact that plants have no blood-vascular system. Passage of the hormones from cell to cell or through the vascular system, especially through the sieve-tubes, is conceivable. It is also possible that the hormone is not transferred but that it arises at the given point through a reaction. Hormones are considered to be chemical substances both organic and inorganic. The reaction might be considered as physical, for example an electrical stimulus; but the author points out that every stimulus must be resolved ultimately into a chemical reaction.—*John H. Schaffner.*

METABOLISM (NITROGEN RELATIONS)

2765. GROENEWEGE, J. Ueber die Denitrifikation mit Ameisensäuren Salzen und den Einfluss des Kation auf diesen Prozess. [Concerning denitrification with formic-acid salts and the influence of the cation on this process.] Dept. Landb. Nijv. en Handel (Nederland.-Indië) Alg. Proefsta. Landb. Mededeel. 7. 22 p. 1921.

2766. LIPMAN, C. B. Does nitrification occur in sea water? *Science* 56: 501-503. 1922.—The writer reviews the meager evidence as to the occurrence and activity of nitrifying bacteria in the open sea and near land surfaces. Recent experiments have proved that such bacteria are absent from open sea water though calcareous sand, taken from under open sea water, is found to "harbor vigorous nitrifying organisms."—*C. J. Lyon.*

2767. LIPMAN, C. B., and J. K. TAYLOR. Proof of the power of the wheat plant to fix atmospheric nitrogen. *Science* 56: 605-606. 1922.—Analyses of wheat plants grown in water cultures ("Shive's best" solution) prove that there is a gain of nitrogen from the air of at least 13-21 per cent of the total nitrogen found in the plant. Experiments with other plants are in progress and a full account of the work is promised.—*C. J. Lyon.*

2768. MAY, C. E., and E. R. ROSE. The tryptophane content of some proteins. *Jour. Biol. Chem.* 54: 213-216. 1922.—A new colorimetric method for the determination of tryptophane has been devised. The per cent of tryptophane in the plant proteins mentioned was found to be as follows: gliadin 1.05, glutenin 1.80, edestin 1.50, phaseolin 0.80, maize gluten 1.08, legumin 1.05, zein 0.00.—*G. B. Rigg.*

2769. WETTSTEIN, FRITZ VON. Das Vorkommen von Chitin und seine Verwertung als systematisch-phylogenetisches Merkmal im Pflanzenreich. [Occurrence of chitin in plants and its significance as a phylogenetic and systematic character.] *Sitzungsber. Akad. Wiss. Wien [Math.-Naturwiss. Kl.] Abt. I.* 130: 3-20. 1921 [1922].—Knowledge of the occurrence of chitin as a compound of the cell wall is largely due to van Wisselingh but is highly incomplete, particularly as regards its distribution among the lower thallophytes. The present is a survey of the occurrence of chitin in plants representative of the lowest to the highest orders.—The microchemical detection of chitin depends on its conversion into chitosans by hot lye; the presence of chitosan is indicated by a red violet coloration upon treatment with a solution of I in KI and a dilute acid. Other tests for chitosans, and the chemical reaction of chitin, are described.—The following conclusions on the distribution of chitin are presented: (1) The Myxomycetes (except *Plasmodiophora*) are sharply distinct from other plant groups in the presence of keratin and other protein substances in the cell wall; cellulose also may be present, but chitin is absent. (2) The Cyanophyceae and Schizomycetes, including Chlamydoacteriaceae, possess cell walls in which pectin-like substances predominate, but chitin is absent. (3) Among the euthallophytes there is evident a general differentiation even in the primitive forms into a line with chitinous membranes (the fungi) and one with cellulose (and modified cellulose) membranes (the algae). The Chlorophyceae without exception lack chitin—true even of heterotrophic forms; the cell walls in the Rhodophyceae and Phaeophyceae contain characteristic polysaccharides neither cellulose nor chitin. The Ascomycetes (except yeasts and Laboulbeniales) and the Basidiomycetes possess chitin or chitin-like substances to the complete exclusion of cellulose. Among the Archimycetes and *Phycomyces* there is a sharp differentiation into chitin- and cellulose-possessing forms, the 2 cell wall

constituents being always mutually exclusive. The Synchytriaceae and the Zygomycetes possess chitin, the Oomycetes without exception lack it. The presence or absence of chitin in the cell wall therefore corresponds in a broad way with morphological distinctions.—*F. Weiss.*

METABOLISM (ENZYMES, FERMENTATION)

2770. BAKER, JULIAN LEVETT, and HENRY FRANCIS EVERARD HULTON. Amylases of the cereal grains. The "insoluble" amylase of barley. *Jour. Chem. Soc. [London]* 121: 1929-1934. 1922.—Extracting ungerminated cereals with cold water does not remove all of the amylase that is present; but a 2nd yield of amylase firmly attached to some cell constituent can be obtained by various treatments, among them by digestion with papain. This indicated a connection with proteins; and the authors' experiments related to determining with what group of proteins the additional amylase was associated. Barley seed-powder was successively treated with solvents chosen to eliminate different classes of proteins; water removed albumins and soluble amylase, NaCl solution removed edestin, and alcohol removed hordein. Portions of the 3 residues were autodigested with papain and the filtrate tested for amylase. The insoluble amylase was found to be associated with the alcohol-soluble group (hordein); but papain could not liberate amylase from hordein itself, nor from a seed-powder that had been heated to destroy previously existing enzyme. Hence the additional amylase did not arise as a cleavage-product from a protein, but from a "pre-existent insoluble enzyme complex."—*F. E. Denny.*

2771. FRÄNKEL, S., und E. SCHWARZ. Über wasserlösliche Vitamine und gärungsbeschleunigende Verbindungen. I. Methodik der Bestimmung und Darstellung der gärungsbeschleunigenden Substanz aus Hefe und Reiskleie. [Water-soluble vitamins and compounds accelerating fermentation. I. Estimation and preparation of the accelerating substance in yeast and rice polishings.] *Biochem. Zeitschr.* 112: 203-235. 1920.—The preparation of the vitamin in yeast is described. It was found that this compound could be estimated qualitatively and quantitatively by its effect on yeast fermentation. This acceleration was measured by the CO₂ evolved in $\frac{1}{4}$ hour, after a preliminary interval of 2 hours, from 5 cc. of 10 per cent yeast suspension, 10 cc. of 10 per cent cane sugar, and yeast vitamin. The acceleration was the excess evolved in comparison with a check, at 28°C.—*H. D. Hooker, Jr.*

2772. GROENEWEGE, J. Ueber das Vorkommen von Emulsin bei Saccharomyceten und das Vorhandensein eines spezifischen Enzyms Zellobiase. [The presence of emulsin in Saccharomycetes and the existence of a specific enzyme cellobiase.] *Dept. Landb. Nijv. en Handel (Nederland.- Indië) Alg. Proefsta. Landb. Mededeel.* 9. 12 p., 1 pl. 1921.

2773. GROENEWEGE, J. Untersuchungen ueber die Zersetzung der Zellulose durch aërobe Bakterien. II. Ueber das Vorkommen von Emulsin in Bakterien, ein Beitrag zur Physiologie der Zellulose-zersetzenden Bakterien. [The destruction of cellulose by aerobic bacteria. II. The occurrence of emulsin in bacteria, a contribution to the physiology of the cellulose-destroying bacteria.] *Dept. Landb. Nijv. en Handel (Nederland.- Indië) Alg. Proefsta. Landb. Mededeel.* 8. 19 p. 1921.

2774. KÖHLER, E. Weitere Beiträge zur Physiologie der Hefe. [Physiology of yeast.] *Biochem. Zeitschr.* 111: 17-29. 1920.—The fermentation of 4 per cent maltose by yeast was measured by the number of CO₂ bubbles given off in $\frac{1}{2}$ minute. A 1st maximum rate was reached in 13 minutes, followed by a minimum 4 minutes later, and a 2nd maximum 23 minutes after that. Six hours later fresh maltose solution was added and the curve was repeated: 1st maximum in 3 minutes, minimum 19 minutes later, and 2nd maximum after an interval of 21 minutes. Increase in the rate is thought to be the result of enzyme activation by the sugar; decrease after the 1st maximum, a result of enzyme consumption in excess of activation; and the decrease after the 2nd maximum, a response to the decreasing concentration of sugar.

Fermentation is considered a type of assimilation, and the enzymatic reaction is thought to occur in the outer regions of the yeast plasma.—*H. D. Hooker, Jr.*

2775. MOLLIARD, MARIN. Sur une nouvelle fermentation acide produite par le *Sterigmatocystis nigra*. [Concerning a new type of acid fermentation caused by *Sterigmatocystis nigra*.] *Compt. Rend. Acad. Sci. Paris* 174: 881–883. 1922.—It has previously been shown that the Mucedineae under certain conditions can change sugar to citric acid or to oxalic acid. Citric acid is formed if the medium is low in nitrogen, and oxalic acid is produced if it is low in phosphorus salts. There is evidence here presented that a 3rd acid may sometimes be formed. Under certain special conditions there is formed an acid which gives Berg's reactions for acid-alcohols.—*C. H. Farr.*

2776. NEUBERG, C., F. F. NORD, und E. WOLFF. Acetaldehyd als Zwischenstufe bei der Vergärung von Zucker durch *B. lactis aerogenes*. [Acetaldehyde as an intermediate product in sugar fermentation by *Bacillus lactis aerogenes*.] *Biochem. Zeitschr.* 112: 144–150. 1920.—Acetaldehyde was formed by this organism from glucose in the presence of calcium sulphite and of disodium sulphite, the yield being greater in the latter case.—*H. D. Hooker, Jr.*

2777. NOTTIN, P. Solubilisation et dégradation diastasique des matières azotées du maïs; application aux fabriques de levure. [The solution and diastasic digestion of the nitrogenous substances in corn; the application to the manufacture of yeast.] *Compt. Rend. Acad. Sci. Paris* 174: 712–714. 1922.

2778. RICHET, CHARLES., EUDOXIE BACHRACH, et HENRY CARDOT. Études sur la fermentation lactique. Le souvenir chez les microbes. [Studies on lactic acid fermentation. The memory of microorganisms.] *Compt. Rend. Acad. Sci. Paris* 174: S42–S45. *Fig. 1–2.* 1922.

2779. SABATIER, PAUL. Catalysis in organic chemistry. [Translation by E. EMMET REID.] 406 p. D. Van Nostrand Co.: New York, 1922.—This is a general work on the subject with abundant references to original sources of information. The work is non-biological, but the elaboration of the mechanism of catalysis and the principles of polymerization, oxidation, hydration, dehydration, decomposition, etc., have application in enzyme systems.—*B. M. Duggar.*

2780. SUMMER, J. B. Sur le cytozome retiré des graines de *Canavalia ensiformis*. [Cytozome extracted from seed of *Canavalia ensiformis*.] *Compt. Rend. Soc. Biol.* 87: 108. 1922.—Seed of this *Canavalia* furnish a mixture of phosphatids endowed with physiological properties analogous to those of the cytozome which occurs in the normal coagulation of the blood.—*J. Dufrénoy.*

METABOLISM (RESPIRATION, AERATION)

2781. B., W. E. Root respiration. [Rev. of: CLEMENTS, F. E. *Aeration and air content: the rôle of oxygen in root activity.* Carnegie Inst. Washington Publ. 315. 183 p. 1921 (see Bot. Absts. 11, Entry 1950).] *Nature* 110: 58–59. 1922.

ORGANISM AS A WHOLE

2782. BRANDL, MAX. Über die Brauchbarkeit pflanzlicher Ersatzmittel des Fleischwassers zur Herstellung von Bakteriennährböden. [The utility of plant substitutes for meat extract in the preparation of bacterial culture media.] Dissertation. 6 p. Munich (Tierärztl. H.), 1920.

2783. BUCHNER, PAUL. Tier und Pflanze in intrazellulärer Symbiose. [Animal and plant in intracellular symbiosis.] 464 p., 2 pl., 103 fig. Gebrüder Borntraeger: Berlin, 1921.—

The volume is essentially a compilation of the data pertaining to the subject, written with the object, as stated by the author in his preface, of showing the need of a fresh consideration and study of the question of the intracellular symbiosis between animals and plants.—The subject matter is arranged under 7 heads, the first 4 grouped according to the natural classification of the invertebrates, dealing with symbiosis in the Protozoa, the sponges, the Coelenterata, the worms, the Bryozoa, the Echinodermata, the Mollusca, the Tunicata, and the Insecta. Besides *Zoochlorella* and *Zooxanthella* the symbionts discussed include various fungi and bacteria. The 5th subhead treats of light-producing symbiosis in the lower animals. The 6th subhead is entitled The Errors in the Investigation of Symbiosis, and in it (as elsewhere incidentally) are discussed the relations of mitochondria. The last subhead embodies the author's concluding remarks.—The volume is abundantly illustrated and contains numerous original figures, particularly in that section dealing with the insects. The index is ample and the bibliography contains approximately 600 titles, principally from zoological contributions.—*Carl Epling.*

2784. FLESC, HANS. Untersuchungen über optimale Nährböden zur Nachkultur bei der Prüfung von Desinfektionsverfahren. [Optimal nutrient media.] Dissertation. 6 p. Munich, 1920.

2785. GROENEWEGE, J. Over de oorzaak van rustiness op rubber van *Hevea brasiliensis*. [On the cause of rustiness on Hevea rubber.] Dept. Landb. Nijv. en Handel (Nederland.-Indië) Alg. Proefsta. Landb. Mededeel. 11. 20 p., 1 pl. 1921. [With English summary.]—The Saccharomycetes and *Oidium* which cause the "rusty" coating on sheet rubber obtain their carbon and nitrogen from protein serum constituents, with the exception of the most important organism *Torula heveanensis* n. sp., which can also utilize the quebrachite. The amount of fermentable sugars in the rubber is insignificant. Freshly rolled and sterilized rubber becomes badly rusted in 24 hours. Dissolving out the water-soluble contents under aseptic conditions does not prevent rustiness, but soaking in the presence of bacteria results in the solution and removal of the proteins as well as the quebrachite and sugars, and prevents subsequent rustiness. Rubber once dried undergoes an irreversible loss of permeability; this prevents inward diffusion of proteolytic enzymes and outward diffusion of soluble substances, so that development of the rustiness organisms on the surface can not take place. Certain other characters of rubber are explained on the basis of irreversible permeability change.—*Carl Hartley.*

2786. PFOTENHAUER, CHARLOTTE, TH. PFEIFFER, und A. RIPPEL. Über den Verlauf der Nährstoffaufnahme und Stoffherzeugung bei der Gerste—bezw. Bohnenpflanze. [The course of food absorption and the increase in dry matter of the barley or bean plant.] Jour. Landw. 69: 137-162. 1920.—The production of dry substances by the plant is increased somewhat by the absorption of minerals and of nitrogen. At the time of ripening no loss of the ash constituents takes place through the roots into the soil. Erroneous conclusions are often drawn because of the dissolving action of atmospheric precipitation. Robertson's formula is not considered correct, for the experimental conditions are never the same. Comparatively low temperatures at the beginning of the growing season cause the first part of the curve to rise too slowly. Barley and mustard show too little growth, while oats, peas, and beans show too much. The difference in growth is probably accounted for by the different dissolving powers of the various roots on the difficultly soluble soil constituents.—*F. M. Schertz.*

2787. REXHAUSEN, LUDWIG. Über die Bedeutung der ektotrophen Mykorrhiza für die höheren Pflanzen. [Significance of ectotrophic mycorrhiza for higher plants.] Dissertation. 47 p. Halle, 1920.

2788. YOUNG, H. C., and C. W. BENNETT. Growth of some parasitic fungi in synthetic culture media. Amer. Jour. Bot. 9: 459-469. 4 fig. 1922.—Previous work on the food requirements of fungi is reviewed. The roles of the so-called essential chemical elements as

well as of calcium and zinc were studied in an attempt to produce a synthetic solution for parasitic fungi. Fungi were found to vary markedly in their requirements. Calcium was beneficial to most species, probably from its effect in correcting acidity, and it is evidently to be regarded as an essential element for fungi. Some species were stimulated by zinc, but in others this produced no effect. A proper balance of the inorganic constituents is very essential and can readily be obtained for any given fungus by the use of the 3-salt system.—The following organisms were used: *Fusarium oxysporum*, *F. batatas*, *F. radicola*, *Rhizopus nigricans*, *Aspergillus niger*, *Botrytis Allii*, *Phoma apiicola*, *Fusarium conglutinans*, *Cercospora Apii*, *C. beticola*, *Sclerotinia libertiana* (strain 1), *S. cinerea*, *S. libertiana* (strain 2), *Rhizoctonia Solani*, *Macrosporium sarcinaeforme*, *Sphaeropsis Malorum*, *Sterigmatocystis Violae*, *Vermicularia* sp., *Ascochyta Pisi*, *Colletotrichum lagenaria*, *Dothidella Quercus*.—E. W. Sinnott.

GROWTH, DEVELOPMENT, REPRODUCTION

2789. HOPKINS, E. F. The effect of lactic acid on spore production by *Colletotrichum lindemuthianum*. *Phytopathology* 12: 390-393. *Fig. 1-2*. 1922.—A strain which produced very few spores in neutral potato dextrose agar sporulated freely on this agar after the addition of 3 drops of a 50 per cent solution of lactic acid to each 20 cc. of agar.—B. B. Higgins.

2790. LEWIS, E. Yeast growth. [Rev. of: SLATOR, A. *Trans. Chem. Soc.* 1921: 115-119. 1921.] *Jour. Soc. Chem. Indust.* 40: 187R.-188R. 1921.—The reviewer stresses many of the facts set forth in the original as indicated below. The growth of yeast has phases: the quiescent or lag phase, the logarithmic phase of unrestricted growth, and the retarded phase. The amount of growth is dependent on the factors that retard growth. If the ratio of the constant of growth to the fermentative activity is constant, the yeast crop is proportional to the amount of sugar, if this is constant. CO₂ may be a limiting factor. The yield of yeast per unit amount of sugar is dependent on the amount of O₂ supplied. Much sugar is needed when there is little O₂. The important point in aerating is to remove the CO₂, not to supply O₂.—G. B. Ray.

2791. MITSCHERLICH, E. A., und FRANZ DÜHRING. Gefässversuche mit Erlen- und Fichtenpflanzen, 1920. [Pot culture experiments with seedlings of alder and pine.] *Zeitschr. Forst- u. Jagdw.* 53: 486-494. 1921.—In continuation of work described in the abstract following, small trees were grown in pots under controlled conditions to study the effects of different factors. The effect of varying volumes of soil and varying concentrations of nutrient solution upon the growth of yearling pine trees was expressed by the equation

$$y = 145 (1 - e^{-2.4c}) (1 - e^{-0.18b}) - 8$$

in which c = concentration of nutrient solution and $b = \frac{1}{8}$ the volume of soil; 8 = original weight of the pine seedling. A concentration of 1.5 per cent nutrient solution was somewhat harmful to the trees, otherwise the observed and calculated values agreed very well.—The growth of young alder trees was observed in relation to amounts of water supplied and to the volume of soil in which the seedlings were grown. With constant water content the trees made better growth, corresponding to increased volume of soil. With constant amounts of soil, however, the trees did not grow better with increased amounts of water. The forest trees make better use of the water which stands in the uppermost layers of the soil, because smaller amounts of energy are used for root growth and for water conduction in the plant.—The effect of the applications of Thomas slag upon the growth of oats and pine seedlings was found to be beneficial up to a certain point. The increased growth of the seedlings was a logarithmic function of the amount of Thomas slag applied and was expressed by the equation

$$\text{Log } (A - y) = \text{log } (A - 6) - 0.33 (x - 0.9)$$

where A = maximum growth, y = growth attained when x grams of Thomas slag were applied. When the amount of soil for each tree and the amount of Thomas slag were used as variables the growth was expressed by the equation

$$y = 90(1 - e^{-0.33(x+0.9)}) (1 - e^{-0.15z1}) - 6$$

The laws of growth exemplified in the equations have a general application to plant growth and afford a logical method of studying the effects of various agencies on growth.—H. S. Reed.

2792. MITSCHERLICH, E. A., FRANZ DÜHRING, und SUSANNE VON SANCKEN. *Das Wirkungs-gesetz der Wachstumsfaktoren*. [The law of growth factors.] *Landw. Jahrb.* 56: 71-92. 1921.—Realizing the inconsistencies of Liebig's Law of the Minimum, the senior author has proposed a more comprehensive law of growth factors which assumes that the magnitude of the plant's growth depends not on one, but on all factors influencing growth. The yield increases according to this law of growth with each single growth factor only when this factor is not too near the limiting value. Any growth factor may, within limits, replace another in its power to increase plant yields, without requiring any assumption that one factor may perform the specific function of another in the plant.—If all the conditions were optimal a certain maximum yield, A , would be obtained. If some necessary factor can be deficient there is a corresponding shortage in the yield, but if the amount of the factor be increased the yield is also increased. The rate at which the yield is increased by a small increase of the factor is proportional to its departure from the maximum yield and is expressed by the equation

$$\frac{dy}{dx} = (A-y)k \quad \text{I}$$

A = maximum yield, y = yield obtained when x = amount of factor present, and k = constant. Upon integration I becomes

$$\log (A-y) = C-kx \quad \text{II}$$

When $x=0$, $y=0$; therefore $\log A=C$, and

$$\log (A-y) = \log A - kx \quad \text{III}$$

This equation affords no evidence of the existence of a Minimum in Liebig's parlance.—Equation III may be written

$$\frac{A-y}{A} = e^{-kx}, \text{ or} \\ y = A(1-e^{-kx}) \quad \text{IV}$$

If 2 dependent factors, x , and x_2 , acting jointly produce a yield of A , the equation will be

$$y = A_1 (1-e^{-k_1x_1}) (1-e^{-k_2x_2})$$

or finally for all growth factors,

$$y = A_{\max.} (1-e^{-k_1x_1}) (1-e^{-k_2x_2}) (1-e^{-k_3x_3}) \dots \quad \text{V}$$

This equation is a mathematical expression of the law above stated. This law is applicable to all factors which exert an influence upon the yield of plants. Internal and external factors of growth may be recognized; the former are hereditary, the latter are climatic and edaphic. Man may influence to some extent the factors concerned with water and with nutrients. The authors have shown that the relative value of 2 fertilizer materials containing the same nutrient must be constant. If 2 materials produce the same maximum yield, A , then each contains the same growth factor. If the constant of one material equals k_1 and that of the other equals k_2 , then in order to produce the same yield, y , one must use an amount, x_1 , of the first material, and an amount, x_2 , of the second material. Therefore,

$$\log (A-y) = \log A - k_1x_1; \log (A-y) = \log A - k_2x_2.$$

By subtraction, $k_1x_1 = k_2x_2$, or, $\frac{k_1}{k_2} = \frac{x_2}{x_1}$

The amounts of the fertilizer to be applied must therefore be inversely proportional to their effects on growth. The law of growth factors gives an exact valuation of the total fertilizer materials and therewith a physiological basis which may throw light on the possibilities of a plant analysis for determining the fertilizer requirements of soils.—Numerous experiments are reported which show the validity of the law of growth factors.—Various plants were grown under differing light intensities. Their growth curves followed the equations:

$$\text{oats (grain and straw), } \log (110-y) = 2.0414 - 2.5 (i - 0.15)$$

$$\text{peas (grain and straw), } \log (42-y) = 1.6232 - 2.5 (i - 0.15)$$

$$\text{peas (grain), } \log (21-y) = 1.3222 - 2.5 (i - 0.177)$$

The value of k in each case was 2.5.—The effect of water upon growth was observed in sand and soil cultures. Plants in sand cultures were irrigated with Tollen's solution. Values obtained were:

vetch in sand,	$\log (35-y) = 1.5441 - 0.000515 w$
oats in sand,	$\log (130-y) = 2.1139 - 0.000515 w$
vetch in garden soil,	$\log (69-y) = 1.8388 - 0.000515 w$
carrot in garden soil,	$\log (70-y) = 1.8451 - 0.000515 w$

The identity of the constant for the different plants in different soils is noteworthy. The author believes that the value of water as a growth factor is independent of the nature of both the plant and the physical character of the soil. By use of equation V, as suggested by Baule [see Bot. Absts. 12, Entry 823], it was shown that the effects of concentration of nutrients and of soil volume are amenable to mathematical treatment:

$$\begin{aligned}\text{oats, } y &= 130.4 (1 - e^{-0.135x}) (1 - e^{-0.24z}) \\ \text{peas, } y &= 340.0 (1 - e^{-0.135x}) (1 - e^{-0.24z})\end{aligned}$$

where x = volume of the soil and z = concentration of nutrients. From this and other data the author believes it makes no difference what plant is used for fertilizer experiments. The fact that each fertilizer material possesses a specific physiological nutrient value makes possible an exact evaluation of fertilizer materials. This furnishes a physiological basis for chemical soil analysis, since it is possible to determine quantitatively the effect of various factors on the yield. It is possible, where irregularities occur, to study the physiological reactions and the effect of different sorts of soils on the fertilizer materials and to pursue the problems further by chemical methods. [See also Bot. Absts. 12, Entry 2795.]—*H. S. Reed.*

2793. PRESCOTT, J. A. The flowering curve of the Egyptian cotton-plant. *Ann. Botany* 36: 121-130. 7 fig. 1922.—The summation flowering curve (total flowers per plant up to a certain mature stage of growth) is worked out for the Egyptian cotton-plant. The methods and equations in obtaining it are given, together with an explanation of its significance in agricultural experiments.—*Marian A. Griffiths.*

2794. PRIESTLY, J. H., and FRED A. EVERSHERD. A quantitative study of the growth of roots. [Abstract.] *Rept. British Assoc. Adv. Sci.* 1921: 454. 1921.

2795. RIPPEL, A. Die gesetzmässige Erforschung von Reaktionsgleichgewicht (Produktionskurve) und Reaktionsgeschwindigkeit (Wachstumskurve) bei den höheren Pflanzen. [The quantitative investigation of the amount and rate of growth of higher plants.] *Jour. Landw.* 70: 9-44. 1922.—This is a résumé of recent work in Germany on the quantitative study of plant growth. Studies are based on the assumption that with a knowledge of all pertinent conditions it is possible to obtain an exact mathematical expression of growth. In dealing with plants it is usually necessary to be content with a practical method for a comparative study of the growth-affecting factors, and later make such refinements as the material may require.—The yield-curve expresses the quantitative result of graded differences in concentration of nutrient substances, other factors remaining constant. The comprehensive law applicable to such phenomena is the law of mass action. The growth-curve deals with reaction-velocities and is essentially a problem in dynamics. The growth reaction behaves as an autocatalytic reaction which is catalyzed by one of the products of the reaction. The value of these views lies in the concept that plant growth in its entirety is an orderly process, capable of quantitative study. This concept has an evident difficulty, namely that the complicated interplay of all possible processes of plant growth should conform to a single physical-chemical law. However, the difficulty does not actually exist because the concept applies, not to the many single physiological processes which operate in the plant, but to their summation.—The production curve is expressed by Mitscherlich [see Bot. Absts. 12, Entry 2792] as follows:

$$\log (A-y) = \log A - kx.$$

The author discusses the relation of this equation to the action of heat, light, and other factors, and he gives a lengthy critique of the fluctuations observed in the value of k , the

so-called "efficiency factor." He holds that Mitscherlich's equation is a full, quantitative expression of Liebig's Law of the Minimum. The equation expresses the quantitative relations between yield and minimum factor. Liebig opposed the idea that when several factors were increased from a minimum to a higher value, without changing their proportionality, a higher plant yield would result. Mitscherlich's investigations afford evidence, however, that this is true. It may also be possible that an increase in the amount of the sole minimum factor might cause a profound mobilization of other substances in the plant.—The curve of growth may be expressed by several equations. The author discusses those proposed by Robertson and by Baule. The external environment has no such influence upon the course of the growth cycle of a species as one might expect on *a priori* grounds. It has been shown that the value of the constants is quite invariable for a given species when grown by various experimenters, in different regions and in different seasons. Different species, however, have very different growth constants.—Since all growth curves eventually become horizontal, it is evident that some limiting factor is operative. The limiting factor may be within the plant or within the environment. The limiting factor is usually operative from the initial stages of growth.—The production curve rests on the law of chemical mass action, although it is impossible to express total yield with all the variable factors involved. If the factors are taken separately, however, it is not difficult to demonstrate their quantitative relations. The assimilation of CO_2 is a case in point.—The growth curves have been shown to resemble those of autocatalysis, as one might expect from the manner of cell-division. The absolute height of the curve is determined by the external factors operative, and the variable factor is time. The flattening of the curve is undoubtedly due to the action of inner, limiting factors, which must be different from those of the production curve. A certain correspondence between the 2 may exist, however, since in the senescent protoplasm absorption and assimilation gradually cease.—*H. S. Reed.*

2796. ROBBINS, WILLIAM J. **Cultivation of excised root tips and stem tips under sterile conditions.** Bot. Gaz. 73: 376-390. Fig. 1-4. 1922.—Apical meristems of peas, corn, and cotton excised from seedlings were successfully grown under sterile conditions in a modified Pfeffer's solution plus glucose. Glucose proved uniformly superior to levulose. With glucose, however, the growth is of the etiolated type, indicating "that it is not an absence of available carbohydrate which causes the stem elongation and small leaf development of plants grown in the dark." Concerning his experiments with tips excised from culture material the writer states: "When the excised root tips of corn are grown for ten days or two weeks in the dark in a solution containing glucose and mineral salts, and the tip is then cut off and transferred to a fresh solution of the same type, the amount of growth in the 2nd period is less than in the 1st, and ceases in the 3rd period." [See also following entry.]—*B. W. Wells.*

2797. ROBBINS, WILLIAM J. **Effect of autolized yeast and peptone on growth of excised corn root tips in the dark.** Bot. Gaz. 74: 59-79. Fig. 1-8. 1922.—In sterile Pfeffer's solution plus 2 per cent glucose, in the dark, excised corn root tips grow much less rapidly than those attached to the grain. When the excised root tips are grown under such sterile conditions for about 2 weeks and the tips then severed and transferred to fresh solutions at intervals: "(a) growth stops in the third period; (b) the addition of peptone or autolized yeast permits the root tips to grow for 4-6 periods; (c) a concentration of 200 ppm. [parts per million] of gelatine, 100 ppm. of creatinine, 79 ppm. of glycocoll, 50 ppm. of asparagin, of the corn extract used show no beneficial effect; (d) in Pfeffer's solution lacking nitrates and containing 2 per cent glucose a little less total growth is made than in Pfeffer's solution containing nitrates and 2 per cent glucose; (e) approximately 400 ppm. of peptone is more efficient than 200 ppm; (f) autolized yeast is more beneficial than peptone; (g) the beneficial effect of autolized yeast does not appear in the first period of growth; (h) concentrations of 10, 40, 80, 200, 400 and 800 ppm. of autolized yeast (equivalent in dry matter to about one-third the concentrations given) show no marked difference in their beneficial effect, especially in the early periods; (i) the higher concentrations of yeast evidence a somewhat greater beneficial effect in the later periods than the lower concentrations." Comparisons are also made, as to the extent of

growth, between excised and undisturbed root tips in media with and without autolyzed yeast. It is further shown that root tips act as individuals and that growth of the primary root tip depresses that of secondary roots. [See also preceding entry.]—*B. W. Wells.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

2798. BIRCH, JOHN J. Important movements of plants. II. *Amer. Bot.* 28: 107-112. 1922.—This is a summary of the positions assumed by growing tips of roots and stems.—*S. P. Nichols.*

2799. BIRCH, JOHN J. Important movements of plants. III. *Amer. Bot.* 28: 159-167. 1922.—This is a summary of the tropic movements of roots and stems.—*S. P. Nichols.*

2800. CHOLODNYJ, N. Zur Theorie des Geotropismus. [The theory of geotropism.] *Beih. Bot. Centralbl.* I Abt. 39: 222-230. 1922.—At present no entirely satisfactory theory of geotropism can be formulated, only a working hypothesis may be presented.—The microsomes move easily in the cytoplasm. They usually possess a higher specific gravity than the surrounding cytoplasm. They carry on their outer surfaces a negative electric charge which they give out in their movement towards the anode. In the plasma of positively geotropic cells the microsomes with a specific gravity less than that of the surrounding fluids prevail. As they move upward they produce a corresponding electrical force.—More work is needed on the role of the ion as well as a thoroughgoing cytological investigation of changes due to gravity. Knowledge of the effect of electricity on the geotropic reactions is also needed. Such investigations might show what is necessary to establish or correct this hypothesis.—*L. Pace.*

2801. JACCARD, PAUL. Sur le mecanisme du redressement geotropique de la tige des arbres. [The mechanism of geotropic readjustment of the trunks of trees.] *Rev. Gén. Bot.* 34: 385-398, 433-441, 481-488, 529-537. *Fig. 1-4.* 1922.—The author tries to establish the determinism of reactions generally considered as tropisms having some useful significance for the species or the individual.—Supposing that the normal form of growth of woody plants, that of trees in particular, is the result of antagonistic forces in equilibrium oriented parallel either to the direction of gravity or to that of optimum light, all deviations from the normal position of equilibrium provoke a readjustment, either a photo- or geotropic reaction which necessitates mechanical work.—One may investigate whether the mechanical forces brought into play during the readjustment of a trunk, for example, are the result of unequal activity of growth due to geotropic excitation perceived at the tip. It is here assumed that the unequal growth is produced in a way to affect the earlier form of static equilibrium with minimum material. On the contrary, the normal form of equilibrium being disturbed, the tension-compression thus produced may cause the unequal activity of the cambium and the eccentric growth which results. This indicates the trend of the author's argument, a detailed review of which cannot be given.—It is believed that the growth acceleration is essentially determined by the reaction to the mechanical effect, due to gravity and engendered by photo- and geotropic orientation. Further it is pointed out that the "finalists" do not deny the influence of mechanical actions on growth in thickness, but admit it only as a complementary claim, as a factor capable of accentuating, enfeebling, or neutralizing the effects of geotropic stimulation. This mixture of "finalism" and "causalism" recalls strongly the concession made by vitalism to physico-chemical determinism in the domain of physiology.—Conformable to the results of his experiments the author believes that the majority of cases of unequal rapidity of growth in thickness of leaning trunks and branches may be explained by the antagonistic action of tension-compression and by the influence of the acceleration or retardation that these forces exert on the activity of the cambium.—The importance of the forces of orientation in growth cannot be overestimated. Their morphogenic influence is affirmed from the beginning of segmentation: it dominates all the karyokineses, and the analogy which these phenomena present between organic polarity and magnetic or electric polarity is not fortuitous.

The difference in behavior of the 2 poles of growth of vegetation exposed to gravity is not stranger than that which distinguishes the magnetic poles of opposite names. The different properties of twigs and roots is only possible as a consequence of this general and original polarity which they carried in the embryo; in the case of twigs and radicle, Letellier has already established it, by a difference of specific gravity which constitutes without doubt one of the immediate reasons for their final differentiation. It is not without interest to remark that in a general way the radicle, having turned from the side of the micropyle, is found from the point of view of its osmotic nutrition in different condition from that of the plumular pole. Without undervaluing the role of heredity, this memory of repeated reactions which are carried out by a specific structure, one cannot avoid thinking that an equal difference might possibly be the first cause of the character of polarity which became accentuated in the repetition.—As to the morphogenic influences which govern nutrition and growth it is necessary to determine the part which they play, thus: (1) the forces of orientation, gravitation, radiation, and to a lesser extent those of chemical affinity, and electric and magnetic currents; (2) osmotic forces which play a part in nutrition; (3) mechanical forces engendered by growth and resulting from gravity; and (4) catalytic forces in which are included enzymic action and the influence of hormones, these last sometimes considered as agents of transmission governing the correlations of growth.—The author does not deny that a number of phenomena such as concern floral biology, the dissemination of seed or the transport of pollen by the aid of insects adapted to the operation, can only be explained in a satisfactory manner by mechanical or chemical actions; therefore in this study it is held that general characteristics of form, type of symmetry, and the deviations which plants undergo are under the influence of morphogenic factors, the dominant forms of which are gravity and light.—*J. C. Gilman.*

2802. RICHME, H. *Sur l'élongation des racines.* [On the elongation of roots.] *Compt. Rend. Acad. Sci. Paris* 174: 880-881. 1922.—The fact that the stem of a horizontal plant turns up and the root turns down makes it seem that the reaction of these 2 structures to the same stimulus is exactly opposite. The experiments here reported are, however, interpreted as showing that they both respond in the same way. It is found that if a root is pricked with a needle it curves during the 1st hour throughout a distance of about 15 mm. If the root is in the normal vertical position this curvature will direct the tip of the root horizontally. This curvature is a modification of internal tensions and is not due to gravity. It will later turn down again, causing the root to assume an elbow form. If, however, the root be pricked when in a horizontal position the curvature always occurs upward at first, just as the stem always grows upward when in a horizontal position. It has previously been shown that if the region of cell elongation of a stem be injured, the stem turns downward; now it appears that if the region of cell division of a root is injured, the root curves upward. It is therefore concluded that the region of cell elongation responds to the stimulus of gravity by causing the organ to bend downward, and the region of cell division responds to the same stimulus by causing the organ to curve upward. Thus it appears that the region of cell division governs the direction of the stem, and the region of cell elongation controls the direction of the root.—*C. H. Farr.*

REGENERATION

2803. WEISS, FREEMAN. *Quantitative relations of regeneration.* [Rev. of: (1) REED, H. S. *Correlation and growth in the branches of young pear trees.* *Jour. Agric. Res.* 21: 849-876. Pl. 1. 1921 (see Bot. Absts. 11, Entry, 793); (2) LOEB, JACQUES. *The quantitative basis of the polar character or regeneration in Bryophyllum.* *Science* 54: 521-522. 1921 (see Bot. Absts. 11, Entry 801). *Bot. Gaz.* 73: 496-497. 1922.—The reviewer thinks that progress toward solving the problem of dominance of the apical part of the shoot "must wait on more adequate information concerning the anatomical relations of the apical and lateral buds and of tissue changes in regeneration." He mentions the following as subjects of further investigation: the comparative efficiency of the apical vascular supply and that of lateral buds; the relative age of terminal and lateral buds; the axial gradient in cases of indeterminate growth and those of limited apical growth; presence of cytoplasmic connections; the effect of callus

deposition in the sieve tubes and lignification changes in the phloem as these are related to a possible gradient in transport efficiency from apex to base.—*B. W. Wells.*

TEMPERATURE RELATIONS

2804. GAIN, EDMOND. *Température ultra-maxima supportée par les embryons d'Helianthus annuus L.* [The ultra-maximum temperature endured by embryos of *Helianthus annuus*.] *Compt. Rend. Acad. Sci. Paris* 174: 1031-1033. 1922.—Seed of sunflower survive a temperature of 85°C., though many lose the power of germination. Gradual drying and heating, alternating with periods of cooling or of constant temperature for many hours, or even days, permits of a considerable raising of this temperature limit. It was found that by heating in successive steps with stops at 80 and 110°C. temperatures as high as 135-150°C. may be reached without destroying the viability of the seed. The highest point reached in these experiments was 155° preceded by 15 minutes at 140°C. As high as 52 per cent of the seed which had been raised to 150°C. germinated. Varieties are found to differ in resistance to heat.—*C. H. Farr.*

RADIANT ENERGY RELATIONS

2805. LUCKIESCH, M. *Ultraviolet radiation. Its properties, production, measurement and applications.* 270 p., 12 pl. D. Van Nostrand Co.: New York, 1922.—The title indicates the general scope of this work. One chapter is devoted to some effects upon living organisms and protoplasm, and another discusses photochemical effects.—*B. M. Duggar.*

2806. STOKLASA, J. *Über die Radioaktivität des Kaliums und ihre Bedeutung in der chlorophyllosen und chlorophyllhaltigen Zelle. I.* [Radioactivity of potassium and its significance in chlorophyll-free and green cells.] *Biochem. Zeitschr.* 108: 109-139. 1920.—The percentage of germination and the rate of growth of all plants investigated was increased by radioactive minerals, stones, earths, and natural waters.—Potassium compounds showed the same stimulation, the activity being attributed to the β -rays of potassium.—*H. D. Hooker, Jr.*

TOXIC AGENTS

2807. PLOTHO, O. VON. *Der Einfluss kolloidaler Metallösungen auf niedere Organismen und seine Ursachen.* [The influence of metals in colloidal solution on lower organisms.] *Biochem. Zeitschr.* 110: 1-32. 1920.—Bacteria, fungi, algae, protozoa, and some higher plants were treated for 1-4 days at 15-20°C. with hydrosols containing 0.003 per cent silver or gold. Absorption of the metal occurred in none of the silver solutions and in none of the gold solutions to which protective colloids were added. Gold absorption took place from weakly alkaline unprotected solutions in all species of *Aspergillus* and *Penicillium* tried, in *Botrytis vulgare* and in *Paramaccium* sp. It never occurred in *Mucor mucedo*, *Monilia variabilis*, *Dematium pullulans*, *Oidium lactis*, or yeast; nor in any of the bacteria, algae, and higher plants treated; nor in amoebae. Gold storage was accompanied by no harmful effects to the fungi other than a delay in the initiation of fructification and a slight retardation of growth in length of the hyphae. It occurred to a greater extent in living than in dead material. The membrane alone was concerned, but no chemical combination with the gold occurred, the metal remaining in the elemental state. Variations in concentration and temperature had no significant effect on gold storage.—*H. D. Hooker, Jr.*

2808. PLOTHO, OLGA, VON. *Der Einfluss kolloidaler Metallösungen auf niedere Organismen und seine Ursachen.* Dissertation. 8 vo, 58 p. Gottingen, 1920.—[See preceding entry.]

2809. RIDEAL, S., and E. K. RIDEAL. *Chemical disinfection and sterilization.* 8 vo, viii + 314 p. Edward Arnold & Co.: London, 1921.—In the introduction the authors write briefly of the relation of microorganisms to human welfare and of the development of methods of disinfection and antisepsis. The remainder of the book may conveniently be divided into

2 parts. Chapters 2-8 treat such topics as disinfection of air, sterilization and preservation of food, sterilization of water, public disinfection, personal and internal disinfection, non-bacterial parasites, and wood preservation. The 6 chapters of the 2nd part treat of the numerous organic and inorganic substances possessing germicidal properties, giving their origin, uses, structural formulae, pertinent physical and chemical characters, trade names, and relative efficiency as germicides. Numerous citations to current literature are given.—*S. G. Lehman*.

2810. STOKLASA, J. Influence du sélénium et du radium sur la germination des grains. [The influence of selenium and of radium on the germination of seeds.] Compt. Rend. Acad. Sci. Paris 174: 1075-1077. 1922.—The seeds of various cereals as well as of *Vicia faba* and buckwheat were tested. Selenium salts in extreme dilutions are found to have a toxic effect, which later changes to a stimulation of growth. All species exposed to radium emanations germinate better. It is also found that radioactivity neutralizes in a large measure the injurious effect of selenium.—*C. H. Farr*.

MISCELLANEOUS

2811. CALDWELL, J. S. Studies in the clarification of unfermented fruit juices. U. S. Dept. Agric. Bull. 1025. 30 p. 1922.—Diatomaceous earth is the most satisfactory aid to the filtration of fruit juices yet employed, producing a product which is clear and transparent when bottled, and retaining the flavor and quality of the fresh juice, at a lower cost than by other methods.—*Ira C. Swanman*.

2812. DENNY, F. E. Formulas for calculating the number of fruits required for an adequate sample for analysis. Bot. Gaz. 73: 44-57. 1922.—Formulas were given, for use under different conditions of sampling, to estimate the number of fruits required in a sample in order to give a desired assurance that an accuracy within certain limits may be attained. Approximately 250 fruits of oranges, lemons, and grapefruit were analyzed individually. The data so obtained were applied to the formulas and numerical examples worked out to illustrate their use.—*F. E. Denny*.

2813. LOEW, OSCAR. Bemerkungen zu Pfeiffer's Entgegnung in betreff der richtigen Anstellung von Topfversuchen. [Remarks on Pfeiffer's reply concerning the correct installation of pot experiments.] Jour. Landw. 69: 163-164. 1920.

2814. McCLENDON, J. F. Chart for the conversion of colorimetric readings into hydrogen ion concentration. Jour. Biol. Chem. 54: 647-653. 1922.

2815. PALITZSCH, SVEN. Manuel pratique de l'analyse de l'eau de mer. III. Déterminations des ions hydrogène par la méthode colorimétrique. [Practical manual for the analysis of sea water. III. Determination of H ions by the colorimetric method.] Bull. Inst. Oceanogr. Monaco 409. 31 p. 1922.

2816. PRICE, T. SLATER. Gelatin. Nature 110: 285-288. 1922.—This is a brief review of the behavior of gelatin under various conditions.—*O. A. Stevens*.

2817. RIDEAL, ERIC KEIGHTLEY, and WILLIAM THOMAS. Adsorption and catalysis in fuller's earth. Jour. Chem. Soc. [London] 121: 2119-2123. 1922.

2818. RUDNICK, R. A., and A. L. BAKKE. The mechanical penetration of the sweet corn pericarp. Proc. Iowa Acad. Sci. 27: 129-132. Fig. 26. 1920.—By suspending the pans of a scale on a pulley it was possible to measure greater pressures than could be used with a Joly balance. Pericarp of corn in the "canning stage," dented, and mature were used, both dry and after 8-72 hours soaking in water. There is a marked increase in the pressure required to penetrate the pericarp as the grain matures. Soaking does not materially reduce the pressures necessary to cause penetration.—*H. S. Conard*.

2819. THÉVENON, L. Contribution à l'étude de la stérilization des plantes fraîches. Recherches sur la conservation des propriétés antiscorbutiques de l'herbe d'orge. [The sterilization of fresh plants. The conservation of the antiscorbutic properties of barley.] Thèse Doct. Univ. (Pharm.) Lyon, 1921.

2820. VIEHÖVER ARNO. Microsublimation of plant products. Jour. Assoc. Official Agric. Chem. 6: 557-559. 1922.—The method used and the results obtained with several plants are reported.—*F. M. Schertz.*

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 2228, 2231, 2232, 2235, 2238, 2242, 2244, 2245, 2248, 2250, 2255, 2258, 2259, 2267, 2268, 2272, 2273, 2278, 2280, 2347, 2383, 2464, 2469, 2483, 2493, 2737)

2821. BEAR, FIRMAN E. Nitrogen economy in soils. Jour. Amer. Soc. Agron. 14: 136-152. 1922.—Temperature, rainfall, soil reaction, the cropping system, fertilizer treatment, and soil texture are some of the factors which cause the point of equilibrium between nitrogen income and outgo in soils to vary. The author gives a general discussion of the subject.—*F. M. Schertz.*

2822. BIZZELL, JAMES A. Disappearance of nitrates from soil under timothy. Jour. Amer. Soc. Agron. 14: 320-326. 1922.—The addition of NaNO_3 to timothy sod in early spring is followed by a rapid disappearance of the nitrate from the upper 8 inches of soil; this disappearance is due only in part to the absorption of nitrogen by the growing crop. The nitrate unaccounted for evidently has been utilized by various soil organisms and is therefore transformed into ammonia or some organic combination.—*F. M. Schertz.*

2823. BROWN, P. E. Soil types as a basis for soil investigations. Jour. Amer. Soc. Agron. 14: 198-206. 1922.—A plea is made for accurate scientific classification of the soils used in experimental work.—*F. M. Schertz.*

2824. DAVIS, R. O. E. The interpretation of mechanical analysis of soils as affected by soil colloids. Jour. Amer. Soc. Agron. 14: 293-298. 1922.—Mechanical analysis does not furnish a true picture of the quantitative distribution of the various sized mineral particles in the soil. The silt and clay groups of mineral particles are made up in part of colloidal material. A water vapor absorption method is described by means of which the colloids present in the silt and clay groups may be determined.—*F. M. Schertz.*

2825. DEIGHTON, THOMAS. Some investigations on the electrical method of soil moisture determination. Jour. Agric. Sci. 12: 207-230. Fig. 1-6. 1922.—After briefly reviewing previous work on the electrical method of soil moisture determination, the author describes further work. "It is concluded that the method gives the mean water content of a volume of soil somewhat greater than a sphere whose poles are the electrodes. Certain resistance-moisture curves obtained in the laboratory are discussed and it is concluded that while at water contents above 10 per cent, the relation found by the American investigators holds good; viz., that the resistance varies inversely as the square of the moisture content; at lower water contents discontinuities appear in the curve. These discontinuities are reversed in the case of artificial mixtures not containing colloids." A tentative explanation of these phenomena is given.—*V. H. Young.*

2826. DEMOLON, A. Oxydation microbienne du soufre. [Sulphur oxidation by bacteria.] Compt. Rend. Congrès Assoc. Française Avancement Sci. 45: 1386-1387. 1921.—Bacteria which oxidize sulphur are found in all soils, but are more abundant in soils rich in humus. The author confirms the parallelism between sulphofication and nitrification.—*J. Dufrenoy.*

2827. EATON, SCOTT V. **Sulphur content of soils and its relation to plant nutrition.** Bot. Gaz. 74: 32-58. 1922.—The author used Hart and Peterson's sodium peroxide method in his sulphur determinations. The phosphorus content was also determined, using the magnesium nitrate method recommended by the Association of Official Agricultural Chemists. The author's summary follows in part: The Alabama, Maryland, and Oklahoma soils analyzed are low in sulphur, phosphorus, and organic matter—the phosphorus being not much greater in amount than the sulphur. The soils of the central states are better supplied with these 3 materials and contain decidedly larger amounts of phosphorus than of sulphur. The Chicago soils have a fairly good content of phosphorus, and a rather high content of sulphur and organic matter. The sulphate-sulphur content of the Chicago soils is high, but this accounts for little of the total sulphur, since the greater part is contained in the large amount of organic matter present. Judging from the results obtained and the work of other investigators, sulphur fertilization should prove quite generally beneficial on the Atlantic coast and the Gulf coast, but of doubtful value in the central states. Soils of a high organic-matter content, such as the Chicago soils, may not need sulphur fertilizers except for high sulphur-using crops. No definite conclusions can be drawn from the data as to the relation of sulphur to chlorophyll development, since any effect upon the chlorophyll may come about through the effect of the sulphur in increasing the nitrogen content of the plants. Flowers of sulphur and sodium sulphate, containing the same amount of sulphur as 100 pounds of gypsum per acre, and gypsum at the rate of 500 pounds per acre caused increased dry weights of sweet corn of 35-66 per cent. Larger amounts of flowers of sulphur and sodium sulphate gave no further increases. The corn soil fertilized with sulphur had a higher moisture content than the controls, the excess in the case of the gypsum series amounting to 5 per cent.—B. W. Wells.

2828. EMERSON, PAUL, and JOHN BARTON. **The potassium-nitrogen ratio of red clover as influenced by potassic fertilizers.** Jour. Amer. Soc. Agron. 14: 182-192. 1922.—The application of various forms of fertilizers on pot-culture tests of a Miami silt loam soil leads to the following conclusions: The amount of K absorbed by red clover varies with the treatment of the soil. Applications of manure, acid phosphate, or combinations of both increase the solubility of the soil K as indicated by the amount taken up by the plant. K is taken up in larger amounts from kainit than from either KCl or K_2SO_4 . Lime as $CaCO_3$ applied to an acid soil apparently has no effect upon the solubility of native soil K, but may possibly over-stimulate nitrate production. Applications of lime slightly widen the K-N ratio but manure or acid phosphate or both in the presence of lime narrows the ratio.—F. M. Schertz.

2829. EMERSON, PAUL, and ROLAND D. FLETCHER. **The effect of Sudan grass on the biological processes in the soil.** Jour. Amer. Soc. Agron. 14: 235-241. 1922.—Sudan grass, a heavy feeder, does not materially reduce the crop-producing power of the soil; neither does it influence the soil to respond favorably to the application of common fertilizers. Sudan grass lowers the total bacterial content of the soil on which it grows but apparently does not interfere with the physiological activities of the microorganisms which are concerned in the production of available plant food. Organisms concerned in the transformations of nitrogen in the soil are favorably influenced by the growing of Sudan grass. This effect is particularly noticeable on the crops which follow.—F. M. Schertz.

2830. GREAVES, J. E. **The influence of irrigation water on the composition of the soil.** Jour. Amer. Soc. Agron. 14: 207-212. 1922.—The intelligent use of irrigation water requires knowledge of the chemical, physical, and biological properties of the soil, together with a knowledge of the composition of the water and its influence upon the chemical, physical, and biological changes going on in the soil.—F. M. Schertz.

2831. HUTCHESON, T. B., and T. K. WOLFE. **The effect of fertilizers on the germination and bacterial development of inoculated soybean seed.** Jour. Amer. Soc. Agron. 14: 284-286. 1922.—Results indicate that fertilizers at the rate used in these experiments when applied to a sandy loam soil in direct contact with soybean seed had no appreciable detrimental effect on

the germination of the seed or on the development of nodules on the roots of the plants.—*F. M. Schertz.*

2832. K[UYPER?], J. **De waarde van stikstof in verschillende kunstmeststoffen.** [The value of nitrogen in different fertilizers.] *Arch. Suikerindust. Nederland-Indië* 30: 733-734. 1922.—A critical summary is presented of an article in *Chemische Industrie* (p. 294, 1922) in which a list of prices is given showing the value of nitrogen in several fertilizers as determined by the German Government. It seems that in many places Chili saltpeter is still regarded as better than ammonium sulphate; but in Java, the 2 are regarded as about equal, with a slight prejudice in favor of ammonium sulphate.—*Peter J. Klaphaak.*

2833. LYON, T. L. **Intertillage of crops and formation of nitrates in soil.** *Jour. Amer. Soc. Agron.* 14: 97-109. 1922.—Experiments on a silty clay loam soil at Ithaca, New York, covering a period of 2 years, are recorded, and the effects of cultivating, scraping, and mulching are discussed. Evidence presented favors the assumption that the nitrate content of the cultivated plats is higher than that of the scraped plats because of the aeration produced by the stirring.—*F. M. Schertz.*

2834. ROBINSON, GILBERT WOODING. **A new method for the mechanical analysis of soils and other dispersions.** *Jour. Agric. Sci.* 12: 306-321. *Fig. 1-4.* 1922.—The author discusses the expression of mechanical composition of soils by curves and suggests that a convenient representation is obtained by showing summation percentage as a function of logarithm of settling velocity. The effect of a gel coating is to reduce the settling velocity of particles, the reduction being a simple function of the thickness of the gel coating. A method of obtaining the mechanical composition of a soil or clay from determinations of the concentration of a settling suspension for different ratios of depth to time is described. A shortened method of mechanical analysis is described which gives results in good agreement with the present standard method, and the effect of various modifications in conditions of working is discussed. An examination is made of the concentration gradients in the settling column of a suspension, and it is shown that below the first few centimeters the change in concentration with depth is very gradual.—*V. H. Young.*

2835. ROBINSON, GILBERT WOODING. **Note on the mechanical analysis of humus soils.** *Jour. Agric. Sci.* 12: 287-291. 1922.—Defects of the various methods in vogue for breaking down organic matter in soils preliminary to mechanical analysis are discussed. The use of a neutral substance such as H_2O_2 proved to be satisfactory. Humus soils treated with H_2O_2 gave considerably larger yields of clay and the results appear to more nearly represent the actual constitution of the soil than those obtained from other treatments.—*V. H. Young.*

2836. SALISBURY, E. J. **The soils of Blakeney Point: A study of soil reaction and succession in relation to the plant covering.** *Ann. Botany* 36: 391-432. *Pl. 15, 5 fig.* 1922.—As the dune systems grow older they exhibit a diminution of carbonates and an increase in organic content. These changes are the result of leaching and of augmentation of the plant covering. They are accompanied by a change from an appreciable alkaline condition to a marked acidity, and are correlated with the succession in the vegetation. There is a tendency on the older banks to develop an acid-tolerant type of vegetation. The H-ion concentration varies not only with the degree of leaching but also with the source of the organic material and the phase of its decomposition. The organic material is mainly responsible for the water capacity of dune soils, and in conformity with this the roots of ephemerals tend to occupy the upper layers where the humus is most abundant. The shingle banks show a similar sequence in reaction, organic content, and water content, as is evidenced by a study of shingle laterals of successive age. Floristic lists of these are given. The salt-marsh phases also show indications of increasing organic content, but in these the most important edaphic factor is the duration and frequency of tidal inundation.—*Roy Hansen.*

2837. TOCHER, J. F. **The citric solubility of mineral phosphates.** Jour. Agric. Sci. 12: 125-143. 1922.—Citric solubility is a purely empirical standard for testing mineral phosphates and is of little value in determining their actual value as fertilizers. The author has carried out carefully controlled analytical experiments on citric solubility and decides that it may to a certain degree be a measure of (1) the fineness of grinding, (2) the presence of alkaline substances in fertilizers approximately of the same composition and ground to the same degree of fineness, (3) the presence or absence of fluorides as well as alkaline substances in slags, and (4) the differences in the constitution of the phosphatic compounds in finely ground fertilizers containing approximately the same proportions of extraneous substances. The author concludes that the only practical tests of the value of phosphatic fertilizers from the agricultural standpoint are: (1) total phosphatic content; (2) degree of fineness of grinding; (3) freedom from injurious substances inhibiting plant growth.—V. H. Young.

2838. VINSON, A. E., and C. N. CATLIN. **Determination of the swelling coefficient of dry soils when wetted.** Jour. Amer. Soc. Agron. 14: 302-307. 1922.—Different soils show marked differences in the rate of swelling, the rate being seriously modified by chemical treatment. An auxograph with a clock giving 1 revolution of the drum in 15 or 20 minutes is recommended as most suitable for studying the rate of swelling.—F. M. Schertz.

2839. WHITING, ALBERT L., and WARREN R. SCHOONOVER. **Nitrate production in field soils in Illinois.** Illinois Agric. Exp. Sta. Bull. 225. 21-63. 1920.—The influence of soil treatment, cropping systems, and time of year on nitrate production is shown. A comparison of green and stable manure during these tests favors the former. Farm practices which reduce the loss of nitrogen by leaching and also the periods of greatest nitrogen utilization are discussed. The data reported are the result of 4 years' work.—O. H. Sears.

2840. WHITTLES, C. L. **A note on the classification of soils on the basis of mechanical analyses.** Jour. Agric. Sci. 12: 166-181. Fig. 1-11. 1922.—Various methods in vogue for classifying soils on the basis of mechanical analyses are discussed and a graphic method is proposed. A bibliography of 58 titles is appended.—V. H. Young.

2841. ZÖRNER, HANS. **Die Bewässerungswirtschaft im Lichte der landwirtschaftlichen Betriebslehre unter besonderer Berücksichtigung der deutschen Verhältnisse.** [Irrigation management in the light of agricultural economy, with special reference to German conditions.] Landw. Jahrb. 57: 605-665. 1922.—A detailed study of the economy of irrigation is presented under 7 general headings: (1) Natural factors in irrigation; relation between climate and irrigation, soil type and irrigation, type of cultivated plant and irrigation, and distribution of irrigation systems in the world under the influence of natural conditions. (2) Economic factors in irrigation; purpose of irrigation, costs, and rents in irrigation. (3) Suitable amount of irrigation. (4) Relation between artificial fertilizers and irrigation. (5) Organization of irrigation in relation to horticultural and field crops. (6) Influence of irrigation on the other branches of agriculture. (7) Irrigation management in Germany.—S. A. Waksman.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 2239, 2247, 2315, 2385, 2392, 2411, 2436, 2437, 2450, 2506, 2512, 2514, 2558, 2666)

GENERAL

2842. COUTINHO, ANTONIO XAVIER PEREIRA. **Notas da flora de Portugal.** [Notes upon Portuguese flora.] 17 × 25 cm., 15 p. Allaud e Bertrand: Paris-Lisbon; Francisco Alves:

Rio de Janeiro, 1921.—The author states that this is the 5th and probably the final fascicle of notes supplementary to his Flora de Portugal, and that it is based upon (1) recent collections, and (2) revision of herbarium material made in the light of later monographic work. The list mentions 54 species, exclusively flowering plants, of which 12 species and 10 varieties or forms are additions to the Portuguese flora. There are also revisions of ranges, corrections of determination, etc. In all cases where additions or corrections occur, the author presents revisions of the keys which occur in his Flora de Portugal; especially keys to the cultivated forms of *Triticum*, to *Fumaria*, and to certain portions of *Viola*. *Silene transtagana*, *Dianthus brachyanthus* Bss. var. *nivalis* Wk. f. *Herminii*, *Hedysarum spinosissimum* L. var. *capitatum* (Desf.) f. *glabrescens*, *Lathyrus Cicera* L. β *subbijugus*, *Viola Kitaibeliana* R. & S. β *beirensis*, *Torilis neglecta* var. *triradiata*, *Lavandula pedunculata* Cav. γ *interrupta*, are proposed as new species, varieties, or forms, the authority being P. Cout. in all cases; *Atriplex foliosum* (Lk.) P. Cout. appears to be a new combination as a subspecies.—E. B. Chamberlain.

2843. HOUSE, HOMER D. A consideration of certain genera proposed by Ehrhart. Amer. Midland Nat. 6: 200-207. 1920.—Ehrhart, like Rafinesque, Sweet, and other writers, published genera without descriptions, merely by designating previously published species. In the present paper the author enumerates 18 genera which were proposed by Ehrhart in 1789, designates type species, and then lists some 80 species, mostly of the Cyperaceae, under the Ehrhartian generic names.—Sister M. Ellen.

2844. KOPS, JAN, F. W. VAN EEDEN, en L. VUYCK. Flora Batava. Afbeelding en Beschrijving der Nederlandsche Gewassen. [Flora of Batavia. Illustrations and descriptions of plants of Holland.] 410°-413° Aflevering. Pl. 2033-2048. Martinus Nijhoff: 's-Gravenhage, 1922.—The vascular plants illustrated in the present parts are *Rubus hirtifolius* Müll. & Wirtg., *R. sulcatus* Vest., *R. Lindleyanus* Lees, *Boltonia asteroides* L'Hérit., *Malva parviflora* L., *Calendula arvensis* L., and *Nicotiana affinis* Moore. The non-vascular plants included are: *Russula Linnaei* Fr., *Cortinarius cinnabarinus* Fr., *C. croceocoeruleus* Pers., *Tricholoma ionides* Bull., *Hygrophorus puniceus* Fr., *H. miniatus* Fr., *Lepiota odorata* Cool., *Mycena pelianthina* Fr. (*M. denticulata* Bolt.), *Polyporus adustus* (Willd.) Fr., *Flammula lenta* Pers., *Stereum sanguinolentum* A.&S., *S. frustulosum* Fr., *Hydnum acre* Quél., and *Trametes Pini* (Brot.) Fr.—J. M. Greenman.

2845. ROY, S. C. A preliminary classification of the wild rices of the Central Provinces and Berar. Agric. Jour. India 16: 365-380. 1921.—Many forms of wild rice [*Oryza*] occur in the Central Provinces. The grains fall before the ear is dead ripe and remain dormant in the soil till the next monsoon and so contaminate the rice crop leading to a considerable loss in yield. The method of pollination of wild rice is described and the occurrence of natural cross-fertilization has been proved by the examination of numerous cultures raised from single plants. Twenty-four types of wild rice are described and classified.—A. Howard.

2846. STEPHENS, T. C. The taxonomic unit. Proc. Iowa Acad. Sci. 27: 41-50. 1920.—The citations are chiefly zoological, to be "interpreted as a protest against the substitution of the subspecies for the species as a taxonomic unit."—H. S. Conard.

PTERIDOPHYTES

2847. BENEDICT, R. C. Have you ever seen *Polypodium vulgare* as an "air plant?" [Rev. of: JOHNSON, DUNCAN S. *Polypodium vulgare* as an epiphyte. Bot. Gaz. 72: 237-244. 1921.] Amer. Fern Jour. 12: 63-64. 1922.—Other instances of common ferns growing as air plants are mentioned.—F. C. Anderson.

2848. BENEDICT, R. C. Variation in ferns. Amer. Fern Jour. 12: 93-96. 1922.—Types of variation in ferns are summarized under 10 heads, and ferns illustrating these types are listed under their respective heads.—F. C. Anderson.

2849. BRECKENRIDGE, L. P. *Asplenium ebenoides*—a station in North Carolina. Amer. Fern Jour. 12: 64-65. 1922.

2850. GRAVES, E. W. A fern collecting trip in Cuba. Amer. Fern Jour. 12: 46-53. 1922.—The author describes his trip, pointing out features of interest connected with the ferns seen. A list of the 51 species collected, distributed among 18 genera, is given. The abundance and locality of each species is noted.—F. C. Anderson.

2851. HERTER, W. *Itinera Herteriana III. Heteropteridophyta austroamericana. (Equisetales Lycopodiales Selaginellales Isoëtales austroamericanae.)* Beih. Bot. Centralbl. II Abt. 39: 248-256. 1922.—The distribution of 20 South American species is given. *Isoëtes Weberi* Hert. is described as a new species from Brazil.—L. Pace.

2852. KITTREDGE, E. M. *Osmunda Claytoniana* forma *Mackiana*. Amer. Fern Jour. 12: 53-57. Pl. 3-4. 1922.—Near Bridgewater Corners, Vermont, Mrs. Mack found a new form which was later named *Osmunda Claytoniana* L. forma *Mackiana* n.f. A description and photographic reproductions of the form are given.—F. C. Anderson.

2853. LONG, BAYARD. Occurrence of *Botrychium matricariaefolium* in New Jersey. Amer. Fern Jour. 12: 1-9. 1922.—The author points out that the species has a fair distribution and a variety of habitats—ranging from low, wet woods or rocky woods containing limestone to sandy thickets. However, the fern shows a preference for acid soil.—F. C. Anderson.

2854. MARSHALL, M. A. *Lycopodium complanatum* var. *flabelliforme* with twenty-five spikes. Amer. Fern Jour. 12: 24. 1922.

2855. MARSHALL, M. A. Reminiscences of a fern lover. Amer. Fern Jour. 12: 16-19. 1922.

2856. [McCALLAN, E. A.] The wild ferns of Bermuda. Agric. Bull. Bermuda Dept. Agric. 1922: 4 p. August, 1922.—A list of native ferns of Bermuda is given with names of stations where each occurs.—H. H. Whetzel.

2857. MCCOLL, W. R. *Cystopteris bulbifera* Bernh. Amer. Fern Jour. 12: 22-23. 1922. 1922.—The author describes a locality in which variant forms of *Cystopteris bulbifera* grow. When these forms are transplanted to other places, they return to their original type form.—F. C. Anderson.

2858. MUNZ, PHILIP A., and IVAN M. JOHNSTON. The distribution of Southern California pteridophytes. Amer. Fern Jour. 12: 69-77. 1922. The authors define what they mean by "Southern California" and divide it into coastal, mountain, and desert areas. Four varieties and 51 species distributed among 7 families are given. Keys to families, genera, and species are also given. Under each species are synonyms, illustration references, location and habitat, and authorities and references for locality records. The article is to be continued.—F. C. Anderson.

2859. UPHAM, ALAN W. A list of ferns found in Woodstock, Conn. Amer. Fern Jour. 12: 96-97. 1922.—The list consists of 26 species and 1 variety distributed among 14 genera. *Botrychium simplex* is new for northeastern Connecticut. *Woodsia ilvensis*, not included in the above list, is found a short distance outside Woodstock's border.—F. C. Anderson.

2860. WEATHERBY, C. A. Is *Botrychium dissectum* a sterile mutant? Amer. Fern Jour. 12: 9-12. Pl. 1. 1922.—The specimen photographed was collected in Cass County, Indiana, and shows 3 well-developed fruiting panicles.—F. C. Anderson.

2861. WEATHERBY, C. A. On a supposed hybrid in *Equisetum*. Amer. Fern Jour. 12: 12-16. 1922.—*Equisetum variegatum* var. *Jesupi* A. A. Eaton has been described as a hybrid of *E. variegatum* and *E. hyemale*. When the New England ranges of *E. variegatum* and its variety *Jesupi* were mapped, it was found that the best station for the hybrid contained neither of the supposed parents and that the closest points of approach of these 2 species is 20 miles. Suggestions regarding hybrids are made, but no attempt is made to solve the problem.—*F. C. Anderson*.

SPERMATOPHYTES

2862. BENNETT, ARTHUR. *Calamagrostis stricta* and *C. strigosa*. Trans. and Proc. Bot. Soc. Edinburgh 27: 305-308. 1919.—The occurrence of these species and their varieties and forms in the British Isles is discussed and further comparison of these with European forms is advised in order to make their adequate definition possible.—*Roxana Stinchfield Ferris*.

2863. BENNETT, ARTHUR. *Potamogeton longifolius* Gay in England. Trans. and Proc. Bot. Soc. Edinburgh 27: 312-314. 1919.—This and related species with which it has been confused are discussed from a systematic standpoint.—*Roxana Stinchfield Ferris*.

2864. CAMUS, HICKEL, et A. [CAMUS.] Les chênes d'Indo-Chine. [The oaks of Indo-China.] Ann. Sci. Nat. Bot. 3: 377-409. Fig. 1-5. 1921.—Sixty-nine species are arranged under the 2 genera, *Quercus* L. and *Pasania* Miquel. These are divided into several subgenera. The following new species are described: *Quercus platycalyx*, *Q. Chevalieri*, *Q. tranninhensis*, *Q. lang-bianensis*, *Q. macrocalyx*, *Q. Poilanei*, *Q. Dussaudii*, *Q. chrysocalyx*, *Q. austrocochinchinensis*, *Pasania sabulicola*, *P. Harmandii*, *P. cerifera*, *P. mucronata*, *P. vestita*, *P. annamensis*, *P. pseudosundaica*, *P. Finetii*, *P. bacgiangensis*, *P. tenuinervis*, *P. auriculata*, *P. gigantophylla*, *P. Pierrei*, *P. kemmaratensis*, *P. Krempfii*, *P. elata*, *P. triquetra*, *P. megastachya*, *P. laotica*, *P. Bonnetii*, *P. Bonnetii* var. *tienyenensis*, *P. Capusii*, *P. Areca*, *P. Magneinii*, *P. tubulosa*, *P. nhatrangensis*, *P. cerebrina*, and *P. dinhensis*. The following new combinations are included: *Pisania Chittagonga* (*Quercus spicata* var. *Chittagonga* King), *P. Thomsonii* (*Q. Thomsonii* Miq.), *P. farinulenta* (*Q. farinulenta* Hance), *P. elephantum* (*Q. elephantum* Hance), *P. Lindleyana* (*Q. Lindleyana* Wall.), *P. sootepensis* (*Q. sootepensis* Craib), *P. tephrocarpa* (*Q. tephrocarpa* Drake del Castillo), *P. truncata* (*Q. truncata* King), *P. baviensis* (*Q. baviensis* Drake del Castillo), *P. Garretiana* (*Q. Garretiana* Craib), *P. Balansae* (*Q. Balansae* Drake del Castillo), *P. hemisphaerica* (*Q. hemisphaerica* Drake del Castillo), *P. cyrtocarpa* (*Q. cyrtocarpa* Drake del Castillo), and *P. calathiformis* (*Q. calathiformis* Skar).—*Paul Weatherwax*.

2865. DENIS, MARCEL. Les Euphorbiées des îles australes d'Afrique. [The Euphorbias of the islands of southern Africa.] Rev. Gén. Bot. 34: 5-64, 96-123, 171-177, 214-236, 287-299, 346-366. Fig. 1-32. 1922.—The Euphorbias are represented in the islands of southern Africa by the genera *Anthostema* (1 species) and *Euphorbia* (63 species). The genus *Synadenium* has been introduced into Reunion. Because of an error of determination which the author corrected, it was thought that the genus *Pedilanthus* was present in Madagascar. This genus remains strictly American. The first object of the research was the revision of all the Euphorbias of the islands of southern Africa with a discussion of their specific characters. Some of the characters which were used have not been considered previously as of taxonomic value (presence or absence and form of the cyathophyll, sexuality of the cyathium, form of the fruit, persistence of the calyx in the female flowers). By rendering the idea of species homogeneous and exact, the author was able to suppress or unite with others a dozen species which had been previously established. He was led to consider the genus *Calycopseplus* as an ancient type of *Euphorbia*. Eleven species are described as new: *E. Humbertii*, *E. Antso*, *E. obcordata*, *E. Caput aureum*, *E. biaculeata*, *E. pedilanthoides*, *E. Viguieri*, *E. mahafalensis*, *E. mangokyensis*, *E. xanthadenia*, *E. brachyphylla*, and *E. hexadenia* (*E. daphnoides* Baill., not Balf. f.). Two new varieties, *E. Perrieri* β *elongata* and *E. enarmensis* β *imbricata*, are described. The author secondly attempted to arrange the species in their natural groups. This is the first trial for

the Madagascar Euphorbias. The chapter on classification was completed with a dichotomous key using characters which were considered most secure and easy of determination. The author considered it impossible to distinguish the Euphorbias of Madagascar by anatomical characters alone. Although anatomy did not furnish the assistance usually expected from it in regard to distinguishing species, it at least confirmed the generic unity, which is otherwise so well defined by the floral constancy. In spite of the multiple aspects and varied adaptations which the Euphorbias of Madagascar present, there is a deep structural constancy. While under the influence of analogous ecological conditions comparable adaptations and morphological convergences between very different systematic elements occur, it is very easy to separate at one stroke species of *Euphorbia*, *Didierea*, or *Asclepias*, because the most profound adaptations do not affect the anatomical characters on which the genus always very definitely rests. In each of the climatic regions of Madagascar is found a certain number of species which seem localized. The central region for example offers a series of forms which are very peculiar from the botanist's point of view and very circumscribed geographically (*E. emirnensis*, *E. orthoclada*, *E. tetraptera*, and *E. ensifolia*). In the 3 regions of the flora of the windward (climate tropically humid) the leafy Euphorbias have persistent leaves; in 2 regions of the flora of the leeward (climate rather dry) the leafy Euphorbias have deciduous leaves. In the south central, the west-south, and throughout the southwest, the xerophytic Euphorbias become fleshy or spiny according to the locality in which they occur. The Euphorbias are remarkable for their adaptations to drought (reserves of water in the pith of the twig or in root tubercles, epidermis protected by reduced transpiration surfaces, embedding of the lenticels, or cutinization of the membrane). As a whole the Madagascar Euphorbias are much more sensitive to the physical influence of the soil than the chemical influence. The sections of *Euphorbia* are separated on the basis of their origin and affinities. They contain some series having a separate evolution. The Madagascar Euphorbias are either strictly endemic, related to the African species (in the great majority of cases), or, exceptionally, related to the Indian species. Concerning the evolution of the Euphorbias in Madagascar, it is possible to make an hypothesis that is in harmony with geologic facts and the epoch of the appearance of the genus *Euphorbia*. During the Nummulitic period, after the reunion of Madagascar with the African continent, the genus *Euphorbia*, which certainly existed at that time, spread to Madagascar by means of the African type *Anthostema*. There it divided into 3 foundation stocks or 3 groups of such stocks which evolved separately: 1 primitive stock of *Anisophyllum*, 1 or more stocks of *Tithymalus*, 1 or more ancestral stocks of *Euphorbia*. The "pro-Euphorbias" have evolved in parallel lines in Madagascar and Africa under the influence of a dry climate. There are produced on each side of the channel of Mozambique a series of comparable xerophytic types, which fact explains the affinities that occur between *Diacanthium* and *Tirucalli* of Madagascar and between the same genera of Africa. The *Goniostemas*, i.e., the leafy Euphorbias, represent the direct inheritance of a group of "pro-Euphorbia" that evolved under a tropical climate. Man has introduced to Madagascar and the southern islands of Africa some species of wide tropical range. His industry has modified, by utilitarian destruction or by fire, the localization or frequency of some indigenous species.—*J. C. Gilman.*

2866. FARWELL, OLIVER A. *Panicum lineare*, Linn. Amer. Midland Nat. 6: 49-51. 1919.—The author discusses the description and distribution of *Panicum lineare* as given by Linnaeus, who defined it as a new species in 1762. He also gives a number of the more important synonyms for the species.—*Sister M. Ellen.*

2867. HALLIER, HANS. Beiträge zur Kenntnis der Linaceae (DC. 1819) Dumort. [Contributions to the knowledge of the Linaceae.] Beih. Bot. Centralbl. II Abt. 39: 1-178. 1921.—The Cistaceae and related families are discussed. From the genus *Reinwardtia* Dumort. a new genus, *Tirpitzia*, is separated; it is represented by 1 species, namely, *T. sinensis* (*Reinwardtia sinensis* Hemsl.). *Ixonanthes Beccarii* from Sarawak and *I. crassifolia* from Borneo are described as new species. *Ochthocosmus* Benth. and *Phyllocosmus* Klotzsch are united in 1 genus, giving *Ochthocosmus sessiliflorus* Baill. (*Phyllocosmus sessiliflorus* Oliv.), *O. africanus*

Hook. f. (*P. africanus* Klotzsch), *O. Dewewrei* (*P. Dewewrei* Engl.), *O. senensis* (*P. senensis* Engl.), *O. Lemaireanus* de Wild. & Dur. (*P. Lemaireanus* Th. & H. Dur.), *O. candidus* (*P. candidus* Engl. & Gilg), *O. congolensis* de Wild. & Dur. (*P. congolensis* Th. & H. Dur.). The following new species are added: *O. parvifolius* from British Guiana, *O. Barrae* from northern Brazil, and *O. Zenkeri* from Kamerun. *Rhodoclada* Baker is placed in the genus *Asteropeia* Thours, giving *A. rhopaloides* Baill. (*Rhodoclada rhopaloides* Baker). A new species, *Asteropeia micraster*, from Madagascar is added. *Rouchera columbiana* is characterized as a new species from Colombia. *Indorouchera* is proposed and described as a new genus and under it the following new combinations, species, and variety occur: *I. Contestiana* (*Rouchera Contestiana* Pierre), *I. Griffithiana* (*R. Griffithiana* Planch.), *I. rhamnifolia* from Sarawak, and *I. Griffithiana* Hallier var. *coriacea* from Borneo. Certain species hitherto referred to *Rouchera* are removed from that genus and their equivalent indicated, as follows. *Rouchera humiriifolia* Planch. = *Hebepetalum humiriifolium* Benth., *R. latifolia* Spruce = *H. latifolium* Benth., *R. macrophylla* Miq. = *Sarcotheca macrophylla* Bl. The following families and some related groups are discussed: Flacourtiaceae, Cappariaceae, Erythroxylaceae, Humiriaceae, Irvingiaceae, Symplocaceae, Salicaceae, Lecythidaceae, Roussaceae, Strasburgeriaceae, Pentaphyllaceae, Diapensiaceae, Oxalidaceae, and Geraniaceae.—L. Pace.

2868. HOFMEYER, JOAN, and E. P. PHILLIPS. The genus *Cyclopia*, Vent. *Bothalia* 1: 105-109. 1922.—Several species of *Cyclopia* have become of some value locally as the source of "bush tea." The genus has been subdivided into 12 very distinct species mostly confined to the Western Province and the southeastern regions. The following new species, varieties, and combinations are recorded: *Cyclopia Burtonii*, *C. brachypoda* (*C. Vogelii* var. *brachypoda* Harv.), *C. brachypoda* var. *intermedia* (*C. Vogelii* var. *intermedia* Harv., *C. intermedia* E. Mey.), *C. Ashtonii*, *C. Bolusii*, *C. montana*, and *C. montana* var. *glabra*.—E. P. Phillips.

2869. HOFMEYER, JOAN, and E. P. PHILLIPS. The genus *Olinia*. *Bothalia* 1: 97-104. *Pl.* 1-3. 1922.—Sim recognized only 1 species, viz., *O. cymosa* Thunb., but divided this into 3 varieties. The examination of all the South African herbarium material shows that 2 of these varieties belong to *O. cymosa* while the 3rd is a distinct species which Klotzsch described as *O. acuminata*. Another species from Zululand and East Pondoland is described for the first time in the present paper as *O. radiata*.—E. P. Phillips.

2870. JUMELLE, HENRI. Un grand palmier du centre de Madagascar. [A large palm in the central region of Madagascar.] *Compt. Rend. Acad. Sci. Paris* 174: 957-960. 1922.—A description is given of a palm, previously described by the author as *Neodypsis basilongus*. It is now identified as the same plant which Beccari earlier described as *Chrysaliidocarpus decipiens*.—C. H. Farr.

2871. KRÄNZLIN, FR. Beiträge sur Kenntnis der Gattung *Telipogon* HBK. [Contributions to the knowledge of the genus *Telipogon* HBK.] *Ann. Naturhist. Mus. Wien* 33: 9-38. 1920.—In addition to the new species listed in Bot. Absts. 8, Entry 2251, the following are also published here for the first time: *Telipogon Phalaena* Reichb. f. in sched., Colombia (Hübsch); *T. Schmidchenii* Reichb. f. in sched., Colombia (Schmidtchen); *T. semipictus* Reichb. f. in sched., Colombia (Karsten), Ecuador (Karsten); *T. Hercules* Reichb. f. Ms., north Peru and Ecuador (Roezl, Lehmann); *T. suffusus* Reichb. f. in sched., Colombia (Lehmann); *T. polynurus* Reichb. f. in sched. (sphalmate *T. polymerus* Reichb. f. in Linnæa 41: 4. 1877), Colombia (Roezl, Kalbreyer No. 1923). Notes are added on 2 imperfectly known species, *T. nitens* Reichb. f. and *T. pamplonensis* Reichb. f.—A. S. Hitchcock.

2872. LESTER-GARLAND, L. V. A revision of the genus *Baphia*, DC. (Leguminosae). *Jour. Linn. Soc. Bot. London* 45: 221-244. 1921.—A revision is presented of the mainly tropical African genus *Baphia*. Fifty-eight species are enumerated, including 3 described as new: *B. myrtifolia*, *B. elegans*, and *B. Nannani* Baker f. *B. elegans* var. *vestita* is also new. Three species are reduced: *B. Mildbraedii* Harms = *B. Wollastoni* Baker f.; *B. ovata* T. R. Sim = *B. Kirkii* Baker; *B. Pynaertii* DeWild. = *B. polygalacea* Baker. Three names are excluded:

B. africana Afz., *B. congolensis* Welw., and *B. lancifolia* Baill. The first of these is a *nomen nudum*, the other 2 are obviously clerical errors for *B. angolensis* and *B. laurifolia* respectively.—A. J. Eames.

2873. MANGANARO, ANA. *Leguminosae Bonaerenses*. [Legumes of the province of Buenos Aires.] An. Soc. Cien. Argentina 87: 77-264. Fig. 1-15. 1919.—The author presents a study of the endemic Leguminosae of the province of Buenos Aires (Argentina). Five chapters are devoted to a general survey of the family under the following captions: (1) Generalities and affinities; (2) development and morphology, comprising a study of the seedling, root, stem, foliar apparatus, agamic propagation, flowering apparatus, fruit, seeds, secretory apparatus; (3) histology; (4) physiology and ecology, including movements and sensitive organs, symbiosis, pollination, dissemination, edaphic and climatic relations, species diffusion and geographic distribution, origin and constitution of the leguminous flora of Buenos Aires, and statistical studies; (5) paleontological records; (6) taxonomy. Keys are given to the *Mimosoideae*, *Papilionoideae*, and *Caesalpinoideae*, and to the genera included under each subfamily. Pages 123 to 262 are given to the descriptive matter of the genera and species recorded for the province. Two new species are described, namely, *Acacia platensis* and *Astragalus argentinus*. One new combination is made, as follows: *Cercidium praecox* (*Caesalpinia praecox* Ruiz & Pav.). A bibliography is appended.—A. Bonazzi.

2874. PHILLIPS, E. P. The genus *Ochna*. *Bothalia* 1: 87-96. 1922.—In the Flora Capensis 3 species of *Ochna* are described but investigations show that there are 9 species in South Africa. These are all described and a key to the species precedes the descriptions. The following new species, new combination, and variety are included: *O. Chilversii*, *O. O'Connorii*, *O. natalitia* Engl. & Gilg (*O. atropurpurea* var. *natalitia* Harv., *Diporidium natalitium* Meisn.), and *O. atropurpurea* DC. var. *angustifolia*.—E. P. Phillips.

2875. PHILLIPS, E. P. The thorn pears (*Scolopia* spp.). *Bothalia* 1: 83-86. 1922.—An examination of herbarium material has led to the recognition of *Scolopia Zeyheri* Szyszy and *S. Ecklonii* Szyszy as specifically distinct, and that *S. Gerrardii* Harv. and *S. Engleri* Gilg are varieties of *S. Ecklonii*. A very distinct species of the genus, collected at Barberton, is described as *S. Thorncroftii*.—E. P. Phillips.

2876. PODPĚRA, JOS. Studien über den Formenkreis der *Cortusa Matthioli* L. [Studies concerning the form variations of *Cortusa Matthioli*.] Beih. Bot. Centralbl. II Abt. 39: 276-287. 1922.—The Brün and Prague museums and the collections of Vienna University and the Kerner herbarium furnished the material for this study. Differences in leaf form, calyx teeth, and hairiness were the basis for separation of this species into races. Seven forms with several subforms are described. *Cortusa Matthioli* belongs to the high mountains of Eurasia. It possesses great plasticity in adjusting itself to local conditions. Such differences are of great importance to the plant geographer and ecologist.—L. Pace.

2877. POLE EVANS, I. B. The flowering plants of South Africa 2^o: Pl. 41-50 [colored]. 1922.—*Aloe Wickensii* Pole Evans, *Commelina benghalensis* L., *Hessea Zeyheri* Baker, *Watsonia Galpinii* L. Bolus, *Massonia latifolia* L., *Kniphofia alooides* Moench., *Heliophila scandens* Harv., *Holmskioldia speciosa* Hutchinson & Corbishley, and *Rhamphicarpa tubulosa* Benth. are described and illustrated. *Ceropegia tristis* Hutchinson is recorded as a new species from Cape Province, Natal.—E. P. Phillips.

2878. POLE EVANS, I. B. The flowering plants of South Africa 2^o: Pl. 51-60 [colored]. 1922.—*Gazania subulata* R. Br., *Pelargonium crassicaule* L'Her., *Androcymbium melanthioides* Willd., *Mesembryanthemum aloides* Haw., *Aloe striata* Haw., *Polyzena haemanthoides* Baker, *Dimorphotheca spectabilis* Schltr., *Mimetes capitulata* R. Br., *Erythrina caffra* Thunb., and *Sparaxis grandiflora* Ker are described and illustrated.—E. P. Phillips.

2879. POLE EVANS, I. B. **The flowering plants of South Africa.** 2¹: Pl. 61-70 [colored]. 1922.—*Corycium crispum* Sw., *Aloe excelsa* Berger, *Gladiolus alatus* var. *namaquensis* Baker, *Gazania pygmaea* Sond., *Ornithogalum Thunbergianum* Baker, *Ferraria antherosa* Ker, *Harveya squamosa* Steud., *Gladiolus Pritzeltii* Diels, *Gazania Pavonia* R. Br., are described and illustrated. *Ochna pretoriensis* Phillips is proposed as a new species from Pretoria.—E. P. Phillips.

2880. PONZO, A. **Considerazioni sulle Cistacee.** [On the Cistaceae.] *Nuovo Gior. Bot. Ital.* 28: 157-173. Fig. 1-9. 1921.—A careful study of the group indicates that there have been several lines of development within the family. *Cistus* represents the oldest branch of the phylogenetic tree, while *Heteromeris*, *Lechea*, and *Hudsonia* are of more recent origin.—Ernst Artschwager.

2881. SCHÖNLAND, S. **South African Cyperaceae.** *Bot. Surv. South Africa Mem.* 3: 1-72. Pl. 1-80. 1922.—The greater part of the text consists of critical notes on the genera of Cyperaceae represented in the South African flora. Selected species have been chosen as illustrative of the genera concerned. These species are portrayed by full-page illustrations; their geographical distribution is indicated, and numerous exsiccatae are sighted. A table is introduced to show the relationship of the South African genera of Cyperaceae. No new species are included.—E. P. Phillips.

2882. SMITH, W. W. **Whytockia, a new genus of Gesneraceae.** *Trans. and Proc. Bot. Soc. Edinburgh*, 27: 338-339. Pl. 7. 1919.—*Stauranthera chiritaeflora* Oliver and var. *minor* W. W. Smith, both from Province of Yunnan, western China, are referred to the new genus *Whytockia*.—Roxana Stinchfield Ferris.

2883. SURGIS, E. **Recherches sur les Frankéniacées.** [Researches on the Frankeniaceae.] *Rev. Gén. Bot.* 34: 409-416, 450-462, 499-507. Pl. 1-4, fig. 1-13. 1922.—The Frankeniaceae, a small family of dicotyledonous plants which has been incorporated in the Caryophyllales, are halophytic plants, being found at the edge of the sea or in dry places, salt deserts in subtropical and temperate regions of 5 parts of the world. All authors who have studied the group have retained it as a family. The difficulties encountered with the genera *Hypericopsis* and *Beatsonia* resulted from the use of such variable characters as pilosity, leaves, calyx, and corolla instead of stamens and carpels, which furnish more constant characters. Five genera are recognized, *Niederleinia*, *Hypericopsis*, *Beatsonia*, *Anthobryum*, and *Frankenia*. *Hypericopsis persica* Boiss. var. *angustifolia* is described as a new variety from southern Persia; *Beatsonia compacta* as a new species from the Island of St. Helena. *Anthobryum* Philippi is transferred from the Primulaceae to the Frankeniaceae and 3 species are included under it, namely, *A. triandrum* (*Frankenia triandra* Remy), *A. tetragonum* Philippi, and *A. aretioides* Philippi. A study of the anatomy of this family completes the paper.—J. C. Gilman.

2884. WOLF, W. **Notes on Alabama plants.** *Amer. Midland Nat.* 6: 151-158. 1919.—Critical notes on several plants are recorded, and a new species, *Talinum Mengesii*, is described from Cullman County, Alabama.—J. M. Greenman.

MISCELLANEOUS

B. E. LIVINGSTON, *Editor*

S. F. TRELEASE, *Assistant Editor*

2885. ANONYMOUS. **Scientific problems and progress.** *Addresses of the presidents of the sections of the British Association.* *Nature* 110: 352-356. 1922.—This article gives brief abstracts of the addresses, including that of H. H. DIXON on Transport of Organic Substances in Plants.—O. A. Stevens.

2886. ANONYMOUS. **The British Association addresses of 1922.** [Rev. of: ANONYMOUS. **The advancement of science 1922.** Addresses delivered at the 90th annual meeting of the British Association for the Advancement of Science, Hull, September, 1922. 252 p. John Murray: London, 1922.] *Nature* 110: 507-508. 1922.—This publication is in anticipation of the annual volume giving a complete record of the British Association's proceedings at the meeting. The practice of such publication is to be commended and is found to meet a public demand. The addresses, slightly abridged in some cases, have been, or are being, reproduced in *Nature*.—*O. A. Stevens.*

2887. BENEDICT, R. C. **Game laws for ferns and wild flowers.** *Amer. Fern Jour.* 12: 33-45. *Pl.* 2. 1922.—The author quotes the law passed by the state of Vermont in 1921 for the protection of native wild plants. The list of the plants protected is included in the law. Many of the plants are becoming rare on account of ravages made by commercial collectors, forest fires, and utilization of the land for agriculture and quarrying. Some remedies, such as the growing of decorative species artificially and the establishing of reservations for the rare species that are in danger of becoming extinct, are suggested. Other states are urged to follow the example of Vermont.—*F. C. Anderson.*

2888. CARINI, A. **Abscès de la région ombilicale dû à la pénétration à travers l'ombilic des semences de Capim (*Melinis minutiflora*).** [Abscess of the umbilical region due to penetration by seeds of Capim.] *Bull. Soc. Path. Exotique* 15: 215-219. *Fig.* 1-3. 1922.—Seeds of *Melinis minutiflora* P. Beaur. and of *Capim jaragua* (*Andropogon rufus* Jacq.) are reported to have produced abscesses by penetrating the skin of the workmen handling large quantities of the seed. Reports of the trouble were rather frequent. The seeds are covered with a series of spines directed in such a way as to permit of easy entrance and difficult removal. Hygroscopic movements, as well, aid in penetration.—*G. H. Godfrey.*

2889. CONN, H. J. **Collaborators in the standardization of biological stains.** *Science* 56: 594-596. 1922.

2890. DAWSON, W. J. **A new method of paraffin infiltration.** *Ann. Botany* 36: 377-378. 1922.—The material is transferred from absolute alcohol to a mixture of 1 part melted paraffin, 2 parts xylol, and 3 parts absolute alcohol; after 24 hours the cork is removed and evaporation allowed to proceed until only the paraffin remains. Transition from absolute alcohol to paraffin is effected in 1 step, at a uniform and sufficiently slow rate.—*W. P. Thompson.*

2891. GEORGESON, C. C. **Summary of work at the stations.** *Rept. Alaska Agric. Exp. Sta.* 1920: 1-12. 1922.—A general summary and review of the work done at the 5 experiment stations in Alaska is presented. This work is given in more detail in the reports of the station superintendents which follow in the same report.—*J. P. Anderson.*

2892. McWHARF, J. M. **The banana as a food product.** *Trans. Kansas Acad. Sci.* 30: 124-125. 1919/21 [1922].—An account is given of the utility of bananas as food, together with a comparison of the calory values of 33 foods in common use, showing bananas as 7th in rank.—*F. C. Gates.*

2893. NYEBØE, M. **Torvs Anvendelighed til Fremstilling af Elektricitet.** [Peat for operating an electric plant.] *Tidsskr. Landokonomi* 11. 497-506. 1922.—A discussion is given of the value of peat or peat moss as fuel to replace coal in the operation of an electric plant.—*Albert A. Hansen.*

2894. O'KANE, W. C. **Crop Protection Institute fellowship.** *Phytopathology* 12: 156. 1922.—The Crop Protection Institute, National Research Council, Washington, D. C., announces 2 fellowships with an income of \$2500 each, to promote research relative to the fungicidal and insecticidal value of sulphur.—*B. B. Higgins.*

2895. PATCH, EDITH M. **Marooned in a potato field.** *Sci. Monthly* 15: 166-180. 1922.—An account is presented of the thoughts and dreams of a scientist while getting together the material for one of the matter-of-fact publications sent out by agricultural experiment stations.—*L. Pace.*

2896. PEARL, RAYMOND. **Trends of modern biology.** *Science* 56: 581-592. 1922.

2897. SAYRE, L. E. **Nature's use of disinfectants and antiseptics.** *Trans. Kansas Acad. Sci.* 30: 388-392. 1919/21 [1922].—This is a general paper of popular interest emphasizing that legal and commercial discouragement of popular study of antiseptics in the preservation of food is inimical to progress. The author also states, however, that he has no intention of advocating unnecessary and indiscriminate use of antiseptics for the purpose mentioned.—*F. C. Gates.*

2898. TUCKER, ELBERT S. **Studies of insects associated with the American mistletoe.** *Trans. Kansas Acad. Sci.* 30: 143-170. *Pl. 1-3.* 1919/21 [1922].—Reference is made to the occurrence of more than 60 insects found associated with the mistletoe (*Phorodendron flavescens* Nutt.). An annotated bibliography of 32 titles is appended.—*F. C. Gates.*

2899. WATSON, J. R. **Correlation between sun spots and Florida freezes.** *Proc. Florida State Hort. Soc.* 35: 166-169. 1922.—The earliest freeze recorded (1766) occurred during a period of high sun spot activity. Of the 6 most severe freezes recorded in Florida (a temperature of 18°F. or lower) all occurred during the periods of high sun spot activity.—*J. C. Th. Uphof.*

BOTANICAL ABSTRACTS

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UNDER THE DIRECTION OF
THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12

JUNE, 1923

No. 5

ENTRIES 2900-3649

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 2968, 2971, 2974, 3006, 3038, 3101, 3139, 3158, 3177, 3188, 3207, 3249, 3253, 3254, 3281, 3288, 3450, 3462, 3526, 3561, 3567, 3574, 3576, 3606)

2900. ANONYMOUS. Combating droughts. Jour. Dept. Agric. Victoria 18: 716. 1920.—The appointment of a commission by the Parliament of the Government of South Africa to inquire into the best methods of combating drought is announced.—*Wm. E. Lawrence.*

2901. ANONYMOUS. Die Bedeutung des Kalkes für Pflanze und Boden. [The significance of lime for the plant and the soil.] Mitteil. Deutsch. Landw. Ges. 38: Flugblatt 66. 1 p. 1923.

2902. ANONYMOUS. Eradication of St. John's wort by means of introduced insects. Jour. Dept. Agric. Victoria 19: 187-188. 1921.—The results of investigations in England were practically negative. The phytophagous beetle (*Chrysomela varians*) appeared to be the only insect that did any serious harm to *Hypericum perforatum*. The introduction of such an insect into Australia is regarded as a very dangerous experiment.—*W. E. Lawrence.*

2903. ANONYMOUS. Meteorology and agriculture. Jour. Ministry Agric. Great Britain 29: 432-436. 1922.—This summary of the report of a committee appointed by the Agricultural Research Council discusses the relation of meteorological research and weather forecasting to agriculture, giving the plan of issuing forecasts in England, together with suggestions for further investigations.—*Roland McKee.*

2904. ANONYMOUS. Pasture top-dressing. Jour. Dept. Agric. Victoria 19: 238-239. 1921.—The application of superphosphate and lime gave better results than superphosphate alone or basic slag. The fertilizers markedly improve the bulk, quality, and palatability of the herbage, and increase the percentage of native clovers.—*Wm. E. Lawrence.*

2905. ANONYMOUS. Rotation for hay growing. Jour. Dept. Agric. Victoria 19: 237. 1921.—“During the past seven years the yields of hay grown after bare-fallow, and after barley and bare-fallow, have been more than double the yield of the plot on which hay was grown continuously.”—*Wm. E. Lawrence.*

2906. ANONYMOUS. **The oat crop. Results of departmental experiments.** Jour. Dept. Agric. Victoria 19: 235-236. 1921.—Superphosphate fertilizer produced better yields than the basic types.—*Wm. E. Lawrence.*

2907. ANONYMOUS. **Weather cycles in relation to agriculture and industrial fluctuations.** Nature 110: 889-890. 1922.—This article contains reviews of several papers presented at the Hull meeting of the British Association.—*O. A. Stevens.*

2908. ANONYMOUS. **Wheat experiment plots.** Jour. Dept. Agric. Victoria 19: 231-234. 1921.—The highest yields in the Wimmera and Mallee districts were obtained from Gallicoli, a new hybrid wheat.—*Wm. E. Lawrence.*

2909. AUDAS, J. W. **The true clovers naturalized in Victoria.** Jour. Dept. Agric. Victoria 19: 650-660. 2 fig. 1921.—Botanical and agricultural information is given for 6 species of introduced clovers.—*Wm. E. Lawrence.*

2910. BARTELS, L. C. **Lucerne experiments. State Research Farm, Werribee.** Jour. Dept. Agric. Victoria 19: 608-611. 1921.—The results are given of variety, rate and frequency of watering, and time of cutting tests.—*Wm. E. Lawrence.*

2911. BEVAN, W. **Cyprus tobacco.** Cyprus Agric. Jour. 17: 34. 1922.—Samples of Cyprus-grown tobacco were sent to the Imperial Institute to ascertain their commercial value either for smoking or for nicotine extract. Thus far it has not been possible to find buyers for the tobacco now on hand; further production except for home use is therefore not recommended.—*Wm. Stuart.*

2912. BEVAN, W. **Latakia tobacco industry in Cyprus.** Cyprus Agric. Jour. 17: 82-83. 1922.—According to the author the Latakia tobacco industry was established in Cyprus during the late war by a small group of Syrians. The writer claims that the preparation of Latakia tobacco is a simpler process than that required for cigarette tobacco. Information is given on handling and curing the crop.—*Wm. Stuart.*

2913. BEVAN, W. **Seed potatoes.** Cyprus Agric. Jour. 17: 36. 1922.—Growers in the plains area of Cyprus usually send their seed stock to the higher lands to be grown the following year and returned. The 1-year subjection of the seed to a colder and later climate seems to renew, or at least prolong, its vigor.—*Wm. Stuart.*

2914. BRÜNE, F. **Der Kartoffelbau in den Mooregebieten Nordwestdeutschlands.** [Potato culture in the moor area of northwest Germany.] Mitteil. Deutsch. Landw. Ges. 38: 7-12. 1923.—The best cultural and fertilizing methods for potatoes on moor soils are outlined. The following points are mentioned as especially important: planting of varieties of strong growth; avoiding too early planting; maintaining a high water table in spring; rolling the field immediately after planting and after each harrowing; and avoiding hilling. To these should be added the selection of adapted varieties.—*A. J. Pieters.*

2915. CUNNINGHAM, C. C., and B. S. WILSON. **Varieties of corn in Kansas.** Kansas Agric. Exp. Sta. Bull. 227. 40 p., 9 fig. 1921.—A study was made of a large number of varieties of corn throughout the state in cooperative tests with farmers. Because of seasonal variations, no one variety proves consistently superior to all other varieties in any one locality. Home-grown seed of adapted varieties outyields introduced seed. Varieties of corn developed under adverse climatic conditions in western Kansas are usually more vigorous and hardy than varieties similar in size and developed in the corn belt. Early varieties from western Kansas when grown in eastern Kansas outyield early varieties from the northern states.—*L. E. Melchers.*

2916. DAVEY, H. W. **Weeds and their eradication.** Jour. Dept. Agric. Victoria 19: 661-664, 705-714. Fig. 1-8. 1921; 20: 10-18. Fig. 9-15. 1922.—This series of articles is prefaced by a general statement about weed control. In part they deal with the control of St. John's wort (*Hypericum perforatum* L.). Experiments were conducted in the Bright district of Victoria, Australia, to determine the ability of strong growing grasses and other plants to force back and ultimately suppress this weed. The heavy crop of dried St. John's wort was burned off, the land plowed shallow and harrowed, and grass seeds sown. After 2 years the following grasses gave most promise: *Poa pratensis*, *Festuca duruiscula*, *Dactylis glomerata*, *Festuca rubra*, *Cynosurus cristatus*, in the order named. The Subterranean clover (*Trifolium subterraneum*) grew luxuriantly, covering the St. John's wort during the spring and autumn; but it dies down during the summer, thus permitting the revival of the weed. Grasses gave better results. *Hypericum androsaemum*, *H. calycinum*, and *H. aponicum* are described briefly.—Wm. E. Lawrence.

2917. DAVIDSON, W. D. **The Irish seed potato trade, with some notes on the distinguishing features of the principal varieties of potatoes.** Jour. Dept. Agric. Ireland 22: 3-13. 1922.—Irish and Scotch seed are equally good in Ireland and England, and better than English. Inspection and varietal certification are restricted to varieties immune to black scab, of which a few are described.—Donald Folsom.

2918. DAVIS, ROBT. L. **Pedigreed fiber flax.** U. S. Dept. Agric. Bull. 1092. 22 p., 9 fig. 1922.—Improved strains of flax have been developed by selection methods. A semi-commercial test showed the pedigreed strains to be superior to commercial fiber flax. A special score card and special instruments for cross-pollinating and for measuring flax have been devised and efforts are now being made to combine desirable characters by crossing the different strains.—J. T. Buchholz.

2919. DOWNING, R. G., and C. McCAULEY. **Field experiments with wheat. Summary of variety trials, 1911 to 1921.** Cowra experiment farm. Agric. Gaz. New South Wales 33: 837-843. 1922.—Cowra is situated some 200 miles from Sydney and is in a good wheat-producing section. About 20 varieties were under trial for 3 years or more, planted early, medium, and late and for both grain and hay. Canberra and Yandilla King were outstanding in yield. Notes are given on all varieties, including those not recommended.—L. R. Waldron.

2920. FARRELL, J. **New Zealand flax (*Phormium tenax*). Propagation, cultivation, and milling treatment.** Jour. Dept. Agric. Victoria 18: 658-671, 705-716. Fig. 1-17. 1920; 19: 77-88, 143-156, 209-223. Fig. 18-40. 1921.—The plant is native of New Zealand and Norfolk Island, and is also found in the Chatham Islands. It was used by the natives before white colonists arrived, and considerable trade was developed by 1828. Of the many varieties, 60 were distinguished by the Maoris before 1870. It is said to thrive better under irrigation than in its native habitat. Less confusion regarding the fiber has existed since it became known as New Zealand hemp. The true flax (*Linum usitatissimum*) fibers are bast cells of the stem, whereas the Phormium fibers are derived from the prosenchymatous wood-cells of the vascular bundles in the leaf. Both the soil and climate of Australia are well suited to the production of Phormium fiber. It is used in the manufacture of binder twine, rope, and other cordage; the ropes are very durable, resisting weathering action better than Manila hemp or hemp.—Wm. E. Lawrence.

2921. FOY, R. NELSON. **Seed testing notes.** New Zealand Jour. Agric. 24: 92-93. 1922.—Meadow foxtail (*Alopecurus pratensis*) and *Poa trivialis* are important grasses, but it is difficult to secure seed with high percentage of germination. Impurities are mentioned.—N. J. Giddings.

2922. GALLAGHER, P. Selection of seed maize. New Zealand Jour. Agric. 24: 79-82. 3 fig. 1922.—Types of ears are discussed and methods of improving corn by seed selection are suggested.—N. J. Giddings.

2923. GANZ. Künstliche Beregnung von Ackerfeld. [Artificial watering of fields.] Mitteil. Deutsch. Landw. Ges. 38: 40. 1923.—Oats, summer and winter barley, luzerne, potatoes, and rutabagas were watered and large increases in yields secured during 3 years. The method of watering is not described.—A. J. Pieters.

2924. GERLACH. Die inländische Eiweisserzeugung. [Domestic protein production.] Mitteil. Deutsch. Landw. Ges. 37: 438-442. 1922.—Attention is called to the fact that before the war $\frac{1}{3}$ of the protein consumed in Germany was imported. The following methods are suggested for increasing the protein supply: (1) increased production, especially the per acre yields, by the use of nitrates; (2) increasing the acreage planted to high protein crops, such as peas, beans, vetches, clover, and lucerne for the better soils and lupines and serradella for sand; (3) production of greater quantities of grass with higher protein content on meadows and pastures (top dressing with nitrate is recommended); (4) feeding urea to cattle to save protein (this process is not yet beyond the experimental stage but has great significance); (5) preventing the loss of fresh fodder in making hay and in the earth pits. To this end the use of fermentation chambers, silos, and the use of the electric current is advised. In the discussion emphasis was placed on the effect of nitrates in encouraging the production of grass at the expense of the legumes. The increased production of lupines on light lands and the breeding of improved varieties was urged. Regarding the ensiling of legumes it was brought out that the use of electric current quickly to raise the temperature had been successful, the disadvantages of this method being the difficulty of always commanding sufficient current. The importance to German agriculture of investigations on ensiling methods was stressed.—A. J. Pieters.

2925. GERLACH. Die Verfütterung von Kartoffeln an Pferde. [Feeding potatoes to horses.] Mitteil. Deutsch. Landw. Ges. 37: 739-740. 1922.—A general statement is made concerning feeding of potatoes to horses, together with advice as to the best methods.—A. J. Pieters.

2926. GORDON, GEORGE S. Farm notes for December, 1920 and January, 1921. Jour. Dept. Agric. Victoria 19: 117-124. Fig. 1-3. 1921.—The results of plot tests on the selection and rotation of wheat are given.—Wm. E. Lawrence.

2927. GORDON, GEORGE S. Farm notes for February. Experimental work at State Research Farm, Werribee. Jour. Dept. Agric. Victoria 19: 181-185. 2 fig. 1921.—In a wheat-growing region of 20 inches annual rainfall a suitable green crop, fed off with sheep, is recommended instead of bare fallowing or plowing in "green manure." Algerian oats gave best results for feeding value, with barley, rape, and peas next in order of value. Wheat following barley was almost ruined by "take all" (*Ophiobolus graminis* Sacc.). A clean crop of wheat followed crops of Algerian oats, rape, and peas.—Wm. E. Lawrence.

2928. GORDON, GEORGE S. Summer forage crops. Jour. Dept. Agric. Victoria 19: 441-444. Illus. 1921.—Results of field tests are given.—Wm. E. Lawrence.

2929. GOULDEN, C. H. Oat production in Saskatchewan. Sci. Agric. 3: 125-134. 1922.—Canada produces about 10 per cent of the world's oat crop, of which Saskatchewan produces about $\frac{1}{3}$. In Saskatchewan oats are used as a straight grain crop, in cultivated rows, as partial substitute for summer fallow, as an annual hay crop, in annual pasture mixtures, and as a nurse crop for grasses and clovers. The leading varieties are Banner, Gerlach, Gold Rain, Abundance, Sixty Day, Cole, Leader, and Liberty. A brief discussion of the ordinary methods of cultivation is given.—T. G. Major.

2930. HANSEN, K. Planteavlten 1921. [The crops of 1921.] Tidsskr. Landokonomi 1922: 436-468. 1922.—A detailed report is presented of the 1921 crop yields in Denmark, including the province of Slesvig.—*Albert A. Hansen.*

2931. HENSEL, R. L., and E. P. HARLING. Russian knapweed: A new weed in Kansas. Kansas Agric. Exp. Sta. Circ. 94. 4 p., 2 fig. 1922.—This weed, *Centaurea calcitrapa* L., was reported in Washington County, Kansas, in July 1921.—*L. E. Melchers.*

2932. KEANE, J. Rotation system for hay growing. Jour. Dept. Agric. Victoria 19: 367-374. 2 fig. 1921.—A rotation with summer fallow gave better results than "hay after barley and bare-fallow" or "hay after barley and peas" where rainfall during the growing period is the limiting factor.—*Wm. E. Lawrence.*

2933. KING, C. J. Water-stress behavior of Pima cotton in Arizona. U. S. Dept. Agric. Bull. 1018. 24 p., 4 pl. 1922.—A report is given of the results of an investigation of the behavior of Pima cotton when grown under different conditions of soil moisture and available plant food in Salt River Valley, where the growing season, though ample for substantial yields, is none too long for the complete development of the plant. Mean period of maturation for 3000 bolls was 68 days, early bolls maturing within a much shorter period than later sets, with a mean difference of 27 days between July and September blooming. "Water-stress" affects most seriously the plants with greatest vegetative growth. Effect of root systems on water-stress behavior was studied and is discussed. There is little difference in size of roots between large and small plants. Severe water-stress in luxuriant plants was not always induced by lack of available moisture throughout the soil mass, but was probably caused by the reduction of the moisture in the soil immediately surrounding the roots faster than it could be restored by capillarity. An important relation is shown between increase in shedding rate during the first 2 months of the flowering season and the gradual reduction of moisture content in the lower soil layers. Heavy rain materially shortened the interval between flowering and shedding. Irrigation water supplied after flower buds begin to form and frequently thereafter produced greater stem growth and a greater number of flowers during the first 45 days of flowering than plants irrigated 16 days later. Sparingly watered plants produced a maximum number of bolls late in the season. An effort should be made to stimulate setting of fruit to the fullest extent during July and August, since the bolls set during this period largely determine the crop.—*J. T. Buchholz.*

2934. KNAPP, GEORGE S. Relation of crop yields to quantity of irrigation water in southwestern Kansas. Kansas Agric. Exp. Sta. Bull. 228. 29 p., 11 fig. 1922.—A study was made of the amount of irrigation water used by sorghums, barley, oats, and wheat under field conditions, and its effect on yields of grain and clover.—*L. E. Melchers.*

2935. MCGOWAN, H. E. Commercial potato growing. New Zealand Jour. Agric. 24: 85-87. 1922.—Where machinery is used for planting and harvesting, the average cost of production and marketing is about \$180 per acre. Oversupplies may be used in making alcohol or potato flour.—*N. J. Giddings.*

2936. MALTE, M. O. The 1000-kernel weight of seed in relation to experimental error. Sci. Agric. 3: 69-71, 119-122. 1922.—Because of great variation in the 1000-kernel weight, it is necessary, in order to obtain as equal stands as possible, to take the 1000-kernel weight into consideration and sow varying amounts of seed, calculated on the basis that equal numbers of germinable seed should be applied to equal areas.—*T. G. Major.*

2937. MAUME, L. Le chlorhydrate d'ammoniaque et les engrais azotés. [Ammonium chloride and the nitrogenous fertilizers.] Ann. Ecole Nation. Agric. Montpellier 17: 244-250. 1918/1919.—It was found that with wheat, ammonium chloride gave results comparing favorably with those obtained when sulphate of ammonia or calcium nitrate were used.—*F. F. Halma.*

2938. MOE, G. G. **Improvement of farm crops in British Columbia.** Sci. Agric. 3: 82-86. 1922.—An outline is given of the methods of breeding small grains, grasses and clovers, potatoes, corn and rye, and root crops.—*T. G. Major.*

2939. MULLETT, H. A. **Crop and fallow competition, Horsham, 1920.** Jour. Dept. Agric. Victoria 19: 356-363. 4 fig. 1921.—The crop and fallow competitions aim to discover and disseminate information concerning the methods by which the best wheat crops are raised in the respective districts. The results are given for the above district.—*Wm. E. Lawrence.*

2940. MULLETT, H. A. **Crop and fallow competition. Report on the Warracknabeal crop and fallow competition.** Jour. Dept. Agric. Victoria 19: 65-72. 5 fig. 1921.—The results emphasize the importance of fallowing, and the use of sheep to increase yields and keep down the weeds and the take-all disease caused by *Ophiobolus graminis* Sacc.—*Wm. E. Lawrence.*

2941. MULLETT, H. A. **Dimboola crop and fallow competition, 1920.** Jour. Dept. Agric. Victoria 19: 257-266. 6 fig. 1921.—This article emphasizes greater care in smut control and gives directions.—*Wm. E. Lawrence.*

2942. MULLETT, H. A. **Grassing golf links and recreation fields. What has been done by the Royal Melbourne Golf Club at Sandringham.** Jour. Dept. Agric. Victoria 19: 749-751. 1921.—Methods are described by which a high class turf was established on poor soil; also the subsequent management. The turf is composed of couch grass (*Cynodon dactylon*) Kentucky Blue grass (*Poa pratense*), and annual meadow grass (*Poa annua*). The greens are laid down with Chewing's fescue (*Festuca duriuscula*) [*Festuca rubra* var. *follax*].—*Wm. E. Lawrence.*

2943. MULLETT, H. A. **Inter-district farm competition. Royal Agricultural Society's second competition, 1920-21.—prizes £ 100.** Jour. Dept. Agric. Victoria 19: 385-426. *Illus.* 1921.—The author relates the benefits derived. "Some 23,000 acres of wheat and 10,000 acres of summer fallow were subjected to a careful investigation and classification" distributed in farms ranging from 513 to 3,000 acres. Judgment was based upon a consideration of the cropping systems, crops, fallows, live stock, storage of water, fodder reserves, and other factors. The results obtained are described.—*Wm. E. Lawrence.*

2944. MULLETT, H. A. **Mallee settlement successful. Second Ouyen farm competition.** Jour. Dept. Agric. Victoria 19: 193-206. 12 fig. 1921.—These competitions are educational in character, stimulating the adoption of up-to-date farming methods. Despite the dense mallee scrub the land may be rapidly and cheaply brought under cultivation, and substantial returns secured the 1st year of settlement. Wheat-growing and sheep raising are recommended.—*Wm. E. Lawrence.*

2945. MULLETT, H. A. **Nhill crop and fallow competition.** Jour. Dept. Agric. Victoria 19: 129-142. *Illus.* 1921.—The results of the annual competitions have shown the value of later seeding, deeper plowing, increased seeding, and manuring. Later seeding permitted the first crop of weeds to be destroyed before planting and a greater yield resulted.—*Wm. E. Lawrence.*

2946. NEWMAN, L. H. **Origin of false wild oats.** Sci. Agric. 3: 169-170. 1923.—This review of an article by Å. ÅKERMAN [Sveriges Utsädesförenings Tidskrift, 1921] contains an application to Canadian conditions. Since it appears that the false wild oat is a mutation and not connected with true wild oats, it should not be considered a dangerous weed.—*T. G. Major.*

2947. PRIDHAM, J. T. **Natural crossing—a danger in growing seed wheat.** Agric. Gaz. New South Wales 33: 849-850. 1922.—Natural crossing in wheat fields intended for seed production should be considered and impurities resulting therefrom rogued out.—*L. R. Waldron.*

2948. REMB. **Der Kartoffelbau im Lichte eigener Erfahrungen und Beobachtungen.** [Potato culture in the light of personal experiences and observations.] Mitteil. Deutsch. Landw. Ges. 38: 21-26. 1923.—The author considers the various factors controlling successful potato culture. Great stress is laid on high grade, disease-free seed. It is stated that slightly immature potatoes when used for seed yielded better than mature ones. Planting machinery, fertilizing, and spacing are among the other topics treated.—*A. J. Pieters.*

2949. RICHARDSON, A. E. V. **Improvement of farm crops by selection.** Jour. Dept. Agric. Victoria 19: 427-439. 6 fig. 1921.—Wheat yields per acre have shown greater increase than any other farm crop in Victoria. This is due to systematic and scientific study during the past 20 years. New varieties have been developed and better farming methods adopted. "There is an unlimited field in Australia for the application of the same systematic methods for the improvement of oat, barley, maize, and potato varieties." The different methods of improvement by seed selection are discussed with a brief consideration of each crop.—*Wm. E. Lawrence.*

2950. RICHARDSON, A. E. V. **Some results in top-dressing of pastures.** Jour. Dept. Agric. Victoria 19: 347-355. 2 maps. 1921.—The results of test plots show that an application of superphosphate, and of superphosphate and lime greatly increases the weight of the herbage, the percentages of clovers and trefoils, and the palatability and stock-carrying capacity of the herbage. These results are most marked in the regions having 20 or more inches of rainfall.—*Wm. E. Lawrence.*

2951. SEIFERT, ALFRED. **Quality of New Zealand hemp.** New Zealand Jour. Agric. 24: 89-91. 1922.—Export of Phormium fiber of the U. S. A. has fallen off due to faults in the milling of the leaves. Practical methods for improving the quality of the fiber are discussed.—*N. J. Giddings.*

2952. SHEPHERD, A. N., and J. M. PITT. **Farmers' experiment plots. Maize experiments, 1921-22.** Agric. Gaz. New South Wales 33: 844-848. 1922.—Notes are given on yields of maize for grain based upon variety trials and upon fertilizer trials for the Murrumbidgee irrigation areas and the lower north coast.—*L. R. Waldron.*

2953. SIMMERMACHER. **Zur Stickstoffdüngung der Schmetterlingsblütler.** [Nitrogenous fertilizers for legumes.] Mitteil. Deutsch. Landw. Ges. 38: 12-13. 1923.—In 1918 and again in 1922 certain lucerne fields were fertilized with various carriers of nitrogen, but in only 1 case out of 7 was there any increase from the use of the fertilizer, and this was small. Similar experiments were made with red clover, *Vicia faba* and peas, but in no case did nitrogenous fertilizers increase yields.—*A. J. Pieters.*

2954. SOUTHWORTH, W. **Improvement of fodder corn for Manitoba and other prairie provinces.** Sci. Agric. 3: 143-151. 1922.—Manitoba-grown seed corn is better for local conditions than that obtained from warmer climates. Strains maturing more rapidly have been isolated by selection. First-generation hybrid seed corn obtained from a cross between a small early variety and a large late variety gave a total crop yield of 4,795 pounds per acre, greater than the crop produced by seed from the larger parent.—*T. G. Major.*

2955. TAYLOR, E. McK., and A. C. BURNS. **The basis of Egyptian agriculture and its relation to the decline in the average yield per feddan of cotton.** Ministry Agric. Egypt Tech. and Sci. Serv. Bull. 25. vi+70p., 4pl. 1922.—The history of the change from the basin system of irrigation to perennial irrigation and the modifications it has made in Egyptian

agriculture are given. Experimental data showing the effects of different fertilizer treatments on the growing of cotton, the chief crop introduced since the change in the methods of irrigating, are reported. A comprehensive bibliography is added.—*Lyman Carrier*.

2956. TENNENT, R. B. **Otago lucerne-growing competitions.** New Zealand Jour. Agric. 24: 170-171. 1922.—The competition was divided into 2 classes, one for irrigated and the other for non-irrigated lucerne. A 23-year old and a 16-year old irrigated field were entered, the former being one of the oldest in New Zealand, and having a truly remarkable stand. The latter secured 3rd place in the competition.—*Mary R. Burr*.

2957. TITUS, CHARLES P. **Cigarettes under the microscope.** 48 p. Publ. by author: East Orange, New Jersey. 1922.—The history of the cigarette is interwoven with that of tobacco. Chapter headings are: Historical, Botanical, Agricultural, Curing, Statistics, Microscopical, Chemical, Purity of product, Aromatics principles, Psychology of smoking, Bibliography. Tobacco seed average about 5000 per pod and nearly 500,000 per ounce, and retain germinating power for about 10 years.—*C. S. Gager*.

2958. TULLOH, I. M. **Goroke crop and fallow competition, season, 1920.** Jour. Dept. Agric. Victoria 19: 266-272. 2 fig. 1921.—This article gives recommendations for the treatment of heavy and light soils.—*Wm. E. Lawrence*.

2959. WAGNER, PAUL. **Stickstoffdüngung der Luzerne.** [Fertilizing lucerne with nitrogen.] Mitteil. Deutsch. Landw. Ges. 38: 49-51. 1923.—The author reports on pot and field experiments with sulphate of ammonia at various rates; in one case red clover was used. The results showed no, or unprofitable, increases in yield.—*A. J. Pieters*.

2960. WARD, F. E. **Some recent lucerne experiences in Canterbury.** New Zealand Jour. Agric. 24: 226-229. 2 fig. 1922.—This article discusses fertilizer experiments at Ashburton, and railway demonstrational areas.—*N. J. Giddings*.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 2920, 2955, 3044, 3097, 3143, 3236, 3238, 3243, 3249, 3288, 3334, 3344, 3379, 3503, 3574, 3621)

2961. ANONYMOUS. **Bernhard Eduard Fernow.** Science 57: 255-256. 1923.—This obituary notice of the prominent forester, author, and educator includes a brief biographical sketch, emphasizing his work in forestry.—*C. J. Lyon*.

2962. ANONYMOUS. **Index Kewensis, supplement V.** Kew Bull. 1921: 408. 1921.—The work, which covers the years 1911-1915, was published in 1921.—*T. J. Fitzpatrick*.

2963. ANONYMOUS. **International conference on phytopathology and economic entomology.** Science 57: 142. 1923.—Announcement is made of the conference to be held near Wageningen, Holland, June 25-30, 1923.—*C. J. Lyon*.

2964. ANONYMOUS. **Lists of staffs of the Royal Botanic Garden, Kew, and of the botanical departments, establishments and officers at home, and in India and the colonies, in correspondence with Kew.** Kew Bull. 1921: Appendix II: 27-42. 1921.—Names, titles, and lines of work are given.—*T. J. Fitzpatrick*.

2965. ANONYMOUS. **New Japanese botanical serials.** Nature 110: 891-892. 1922.—This is a brief statement regarding the first issues of the Japanese Journal of Botany and Acta Phytochimica.—*O. A. Stevens*.

2966. ANONYMOUS. **Obituary. Sir Isaac Bayley Balfour.** *Nature* 110: 816-817. 1922.—I. B. Balfour, son of J. H. Balfour who was professor of botany at the University of Edinburgh from 1845 to 1879, was born at Edinburgh on March 31, 1853, and died at Court Hill, Haslemere, on November 30, 1922. He was educated at the Edinburgh Academy and at the University, receiving a degree in science and later in medicine. He continued botanical studies in the universities of Strasbourg and Würzburg, and was appointed professor of botany in the University of Glasgow in 1879. In 1884 he became Sherardian Professor of botany at Oxford, and in 1888 professor of botany at the University of Edinburgh, King's Botanist for Scotland, and Regius Keeper of the Royal Botanic Garden. These positions he held until March, 1922. Prominent among his early work was a botanical survey of Socotra and studies of *Halophila* and *Pandanus*. Later he devoted much time to the genera *Primula* and *Rhododendron*. He contributed to the English edition of DeBary's Fungi, Mycetozoa and Bacteria and to the *Annals of Botany*.—O. A. Stevens.

2967. ANONYMOUS. **The centenary of Pasteur's birth.** *Science* 57: 17. 1923.—This is a list of several meetings held during December, 1922, throughout the world, with mention of the speakers on these occasions.—C. J. Lyon.

2968. ANONYMOUS. [The Lingnaam Agricultural Review.] *Lingnaam Agric. Rev.* [Canton, China] 1⁴: 2nd unnumbered page. 1922.—This new semi-annual serial is announced of which the first number was published in December, 1922. It is intended primarily for the results of research carried on at Canton Christian College, but manuscripts on agricultural and related work by others in the Orient are invited. The serial is published by the College of Agriculture of Canton Christian College and is edited by C. O. Levine of the same institution. The subscription price is \$2.00 a year, but the publication will be sent on an exchange basis to "agricultural colleges and publishers of scientific and technical agricultural bulletins and periodicals."—J. R. Schramm.

2969. ANONYMOUS. **The Royal College of Science for Ireland.** *Nature* 110: 814-816. 1 fig. 1922.—This is a brief account of this college, founded in 1865.—O. A. Stevens.

2970. ANONYMOUS. **William Purdom.** *Kew Bull.* 1921: 408. 1921.—This is a note concerning the life and botanical work of Purdom who died at Peking, China, November 7, 1921.—T. J. Fitzpatrick.

2971. CHERRY, THOMAS. **The discovery of agriculture.** *Jour. Dept. Agric. Victoria* 19: 577-586, 641-649. 1921.—Evidence is given to show that barley, millet (probably a species of *Sorghum*) and the root tubers of the nut rush, (*Cyperus esculentus*), formed a part of human food at the beginning of Egyptian civilization. The author argues that these plants were found growing wild and that the art of cultivation was learned by imitating the natural conditions along the Nile, which occur in no other region. The Nile overflows at the end of the hot season and sufficient moisture remains in the soil to mature crops in the following spring, conditions which suit the requirements of barley and millet. The annual overflow would lead primitive man to scrape away shallow channels and throw up low ridges that the flood waters might pass to other ground. The periodic deepening of these channels would finally result in basin irrigation. Tillage by means of a stick may have started from the observation that areas trampled by wild animals produced a better growth of plants. The author denies that agriculture began in many independent localities, by a series of gradual steps. From a study of the biology and ecology of barley and wheat it appears that the wild ancestors of these cereals no longer exist and that the later stages of their evolution took place under special conditions. The author believes that barley originated in the Nile Valley and that wheat came from an island in the Aegean Sea, for on an island it would be protected from herbivorous animals, as it is defenseless in the struggle for existence. "They were evolved in regions of dry and nearly rainless summers, and therefore, not in any forest region (which implies heavy rainfall) or in a snow-clad winter climate." The rapid development of Egyptian civilization can be regarded as a natural consequence of the discovery of these 2 valuable plants.—Wm. E. Lawrence.

2972. FARMER, J. B. *The West Indian College of Tropical Agriculture*. *Nature* 110: 775-776. 1922.—This institution was opened on October 16. It has a site of 85 acres located about 7 miles east of Port of Spain, Trinidad. The site is considered exceptionally good. The provisional arrangement includes a 3-year diploma course, a 1-year elementary course, courses for agricultural officers, and facilities for graduate research.—*O. A. Stevens*.

2973. GOLDSCHMIDT, RICHARD. *Richard Hertwig und die experimentelle Zoologie*. [Richard Hertwig and experimental zoology.] *Naturwissenschaften* 8: 771-774. 1920.—This paper, one of a series of biographical sketches published in honor of Richard Hertwig's 70th birthday, deals with his work as an experimental zoologist.—*J. L. Collins*.

2974. LIPMAN, J. G. *Tendencies in agricultural research*. *Science* 57: 71-76. 1923.—In his address the author shows by an historical analysis how agricultural research gave effective aid to the pioneer stage of American agriculture. Recent progress has been along lines of soil building and exact information concerning soil biology. The present problems are those of proper handling and use of food resources, and conservation in every phase of farm activity.—*C. J. Lyon*.

2975. LUSK, GRAHAM. *Pasteur, the man*. *Science* 57: 139-141. 1923.—The author recounts many incidents in the life of Pasteur that reveal his personal characteristics. His development as a scientific worker is traced from his earliest preparation in the École Normale at Paris.—*C. J. Lyon*.

2976. RHODE, ELEANOUR SINCLAIR. *The old English herbals*. *xii + 243 p., 18 pl.* Longmans, Green & Co.: London, 1922.—The author discusses and quotes freely from the Leech Book of Bald, the Lacnunga, Bartholomaeus Anglicus De Proprietatibus Rerum, Banckes's Herbal, the Grete Herball, and those by Turner, Gerard, Parkinson, Culpepper and Cole. A number of herbals dealing with New World plants are also discussed. The author then turns her attention to 16th and 17th century still room books. The work is concluded by a very complete bibliography of manuscript, and of early printed herbals which are the work of Englishmen, of or foreigners resident in England.—*C. W. Dodge*.

2977. WATERHOUSE, G. A. *Presidential address (including an account of some breeding experiments with the Satyrine genus Tisiphone)*. *Proc. Linnean Soc. New South Wales* 47: i-xx. 1 map, 2 colored pl. 1922.—Mention is made of the two 1921 meetings of the Australian Association for the Advancement of Science at Sydney (May) and at Melbourne (August), where it was decided to publish a quarterly abstract of papers by scientific workers in Australia. Attention was called to the fact that the card catalogue of scientific and technical periodicals in the chief libraries of the Commonwealth has been completed by the Commonwealth Institute of Science and Industry. Its publication is planned.—*Eloise Gerry*.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 2959, 2972, 2974)

2978. ANONYMOUS. [Rev. of: (1) MARSHALL, C. E. *Editor. Microbiology*. 3rd ed., *xxviii + 1043 p., 1 pl.* J. and A. Churchill: London, 1921. (2) ANONYMOUS. *Laboratory manual in general microbiology*. Prepared by the Laboratory of Bacteriology and Hygiene Michigan Agricultural College. 2nd ed., *xxii + 472 p., 1 chart.* J. Wiley and Sons: New York; Chapman and Hall: London, 1921.] *Nature* 110: 694. 1922.

2979. ANONYMOUS. [Rev. of: SHANN, E. W. *First lessons in practical biology*. *xv + 256 p.* G. Bell and Sons: London, 1922 (see Bot. Absts. 12, Entry 2987).] *Nature* 110: C01-C02. 1922.—The reviewer cites a number of errors.—*O. A. Stevens*.

2980. COSTANTIN, J., et F. FAIDEAU. *Histoire naturelle illustrée. I. Les plantes* [Illustrated natural history. I. Plants.] 316 p., 26 pl., 796 fig. Larousse: Paris, 1922.

2981. EBERHARDT, PH. *Précis de botanique agricole, industrielle, et médicale.* [Manual of agricultural, industrial, and medical botany.] 219 p. Challamel: Paris, 1920.

2982. KENOYER, L. A. *Plant studies for Indian high schools.* viii + 159 p., 67 fig. The Christian Literature Soc., United Provinces Branch: Allahabad, India, 1922.—“As the best way to know plants is to grow them, emphasis is placed on those avenues of approach to plant life that are open to the pupil in the school garden.”—C. S. Gager.

2983. LOWSON, J. M. *A text-book of botany.* 6th ed., 8 vo, viii + 638 p. University Tutorial Press, Ltd.: London, 1922.

2984. MARTIN, GEORGE W. *What is a plant?* Science 57: 175-176. 1923.—Dictionary definitions of the term plant are considered unsatisfactory for use in college classes in botany. The writer suggests the following: “A plant is an organism possessing chlorophyll or descended from chlorophyll-possessing ancestors.” It is recognized that this definition excludes the bacteria and in view of the possibility that they antedate distinction between plants and animals, this seems desirable.—C. J. Lyon.

2985. MOON, TRUMAN J. *Biology for beginners.* x + 558 p., 168 fig. Henry Holt & Co.: New York, 1921.—The book comprises 54 chapters, of which 14 have to do with botany, one with biology and agriculture, and one with bacteria; the remaining chapters deal with general biology and animals. Each chapter is preceded by a vocabulary of both technical and non-technical words, and is followed by a bibliography for collateral reading, and in many cases by a summary. “The course emphasizes the fact that biology is a unit science, based on the fundamental idea of evolution rather than a forced combination of portions of botany, zoology, and hygiene.”—C. S. Gager.

2986. PARKER, JOHN H. *Laboratory instruction in field crops at Kansas State Agricultural College.* Jour. Amer. Soc. Agron. 15: 43-54. 1923.

2987. SHANN, E. W. *First lessons in practical biology.* xv + 256 p., 71 fig. G. Bell and Sons: London, 1922.—This text is intended primarily for use in lower fifth forms in English schools and includes the study of both plants and animals. The illustrations have been selected to demonstrate the method of drawing in a notebook, a new feature being the introduction of drawings by the boys themselves. [See also Bot. Absts. 12, Entry 2979.]—C. S. Gager.

CYTOLOGY

G. M. SMITH, *Editor*

(See in this issue Entries 3115, 3121, 3123, 3147, 3157, 3185, 3219, 3226, 3228, 3238, 3255, 3256, 3258, 3262, 3280, 3464, 3557)

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEO. D. FULLER, *Assistant Editor*

(See also in this issue Entries 2915, 2933, 3146, 3211, 3274, 3334, 3366, 3488, 3619)

GENERAL, FACTORS, MEASUREMENTS

2988. ANONYMOUS. [Rev. of: FLATTELY, F. W., and C. L. WALTON. *The biology of the seashore.* xvi + 336 p., 16 pl. Sidgwick and Jackson: London, 1922.] Nature 110: 540. 1922.—This book is an exhaustive summary of the known facts and “bristles with suggestions for research.”—O. A. Stevens.

2989. ANONYMOUS. [Rev. of: KENDREW, W. G. *The climates of the continents.* xv + 337 p. Clarendon Press: Oxford, 1922.] *Nature* 110: 630. 1922.—This is a well arranged, lucidly written account of the climates of the regions of the world.—O. A. Stevens.

2990. BURTT DAVY, JOSEPH. *The suffrutescent habit as an adaptation to environment.* *Jour. Ecology* 10: 211-219. 2 fig. 1922.—Accepting the hypothesis that woody plants are the more ancient and that herbaceous forms have been derived from them, it is noted that in arid portions of South Africa arborescent plants are scarce and seem largely replaced by suffrutices. It is pointed out that the climate is hostile to tree development in its dry winters, extremes of temperature, and desiccating winds, resulting in the development of grasses and other herbs and frutices. A number of the latter are from genera that normally are arborescent only. These are interpreted as possibly an intermediate stage in the evolution of an herbaceous type. A number of suffruticose species are cited and their growth-habit described, including *Parinarium capense* (Rosaceae), *Eugenia pusilla*, *Erythrinia Zeyheri*, *Myrica brevifolia*, *Acacia stolonifera*, *M. elliptica*, and *Zizyphus helvola*.—Geo. D. Fuller.

2991. [C., W. E.] *Hull and the East Riding.* [Rev. of: SHEPPARD, T. Editor. *Handbook to Hull and the East Riding of Yorkshire.* viii + 532 p. A. Brown and Sons: London and Hull, 1922.] *Nature* 110: 539-540. 1922.—It was prepared for the members of the British Association for the Advancement of Science on the occasion of their visit to Hull, in September, 1922. Nearly 300 pages are devoted to the fauna and flora.—O. A. Stevens.

2992. CHOUX, P. *Revue des travaux de botanique tropicale et subtropicale (1910-1919).* (Suite.) [Review of the work in tropical and subtropical botany (1910-1919). (Continued.)] *Rev. Gen. Bot.* 34: 547-555, 596-603, 669-675. 1922.

2993. CHUN, P. [The insectivorous plants.] Ko-Hsueh [Science—Publ. Chinese Sci. Soc.] 7: 711-716. 1922. [Text in Chinese.]—An historical review is presented of the discovery of the plants and the accounts of their physiology, anatomy, sensitivity, and ways of capturing their prey. One species each of the following families is described: Sarracenaceae, Nepenthaceae, Droseraceae, and Lentibulariaceae.—Chunjen C. Chen.

2994. HARRIS, THISTLE. *Pseudo fulgurites.* *Australian Nat.* 5: 72. 1923.—The roots of plants form carbonic acid which partially dissolves the carbonate of lime of shell fragments in the soil thus forming rough, tube-like structures which remain after the roots decay. They are thus unlike true fulgurites formed by lightning striking in the sand.—T. C. Frye.

2995. KASSNER, C. *Die Trieblänge der Fichten und das Wetter.* [The twig length of spruce and the weather.] *Mitteil. Deutsch. Landw. Ges.* 38: 51-52. 1923.—The author gives records of growth, temperature, and precipitation at Hechingen for 1907-1920 inclusive, to show the relation between twig growth, temperature, and moisture.—A. J. Pieters.

2996. LARSEN, J. A. *Effect of removal of the virgin white pine stand upon the physical factors of site.* *Ecology* 3: 302-305. Fig. 2. 1922.—Experiments were performed in northern Idaho throughout July and August, the hottest and most critical months of the growing season, on the effect of the removal of dense virgin timbers upon air and soil temperature, humidity, soil moisture, and evaporation. One station was in uncut, 300-year-old western white pine forest; a 2nd in a recently logged white pine, hemlock, western red cedar forest with $\frac{1}{2}$ forest cover; a 3rd on land cleared in 1910 with practically no forest reproduction and no trees. The stations were only a few hundred feet apart. Temperature and humidity were taken at a height of 4.5 feet; evaporation, 6 inches above the soil surface. The air in the uncut forest was about 10°F. higher at a height of 4½ feet than in the open at night, and about 10°F. cooler during the day. Daily soil fluctuations of 4 or 5°F. at 6 inches depth occurred in the open, but only 1° in the forest, the soil being warmest in the open from 12 to 2 o'clock at night and at 4 a.m. in the forest. Evaporation was more than twice as great in the open as under timber,

being intermediate in the partly cut area. Relative humidity was similar in this respect to evaporation. Soil moisture was lowest in the virgin timber. This is probably accounted for by rainfall interception and high transpiration. Water-content at all of the stations was thought to be high enough for white pine seedlings. Their survival in cut-over areas would depend upon humidity, temperature, and rate of transpiration. Many of the evergreen species common on the floor of white pine forests had disappeared in the cleared area.—*J. E. Weaver.*

2997. NEWTON, R. **Plant distribution as related to climate.** *Sci. Agric.* 3: 137-142. 1922.—This is an account of the work of LIVINGTON and SHREVE [see *Bot. Absts.* 12, Entry 210].—*T. G. Major.*

2998. SHREVE, FORREST. **Conditions indirectly affecting vertical distribution on desert mountains.** *Ecology* 3: 269-274. 2 fig. 1922.—Influence of altitude *per se* has yielded no conclusive results of importance from experiments by plant physiologists. The "altitude factor" includes differences of insolation, temperature, rainfall, humidity, evaporation, and a score of related conditions. Desert areas of southwestern U. S. A. furnish an excellent field for such studies because of undisturbed conditions on the mountains. Cases are described in which the variety of the earth's surface so modifies the vertical gradients of physical conditions that dissimilar communities are found at the same altitude in adjacent localities. An increase in basal elevation of 2,000 feet has pushed the pine forests upward about 1,800 feet in the Pinaleno Mountains as compared with the Santa Catalinas, orientation, character of rock and soil being almost identical. Experimental evidence points to this as caused by the ratio of evaporation to soil moisture. Different types of vegetation, e.g., desert species as compared with evergreen oak forest, are found at the same altitude, on comparing small and large mountains with the same base level. On small mountains desert species may range 900 feet higher than on larger ones with similar soil, etc. Character of rock and soil profoundly affect altitudinal range. Differences in mineralogical character of mountains similar in basal elevation and height appear to influence the vertical distribution of plants in certain cases by about 600 feet, desert plants reaching higher elevations on the volcanic soils. Some evidence is offered to show that the separate modifying influences of the mineralogical nature and total elevation are additive.—*J. E. Weaver.*

2999. T[ANSLEY], A. G. **Methodology: the new Zurich-Montpellier school.** [Rev. of: (1) BRAUN-BLANQUET, J. *Prinzipien einer Systematik der Pflanzengesellschaften auf floristischer Grundlage.* (Principles of a systematic plant association on a floristic basis.) *Jahrb. St. Gallisch. Naturwiss. Ges.* 57: 305-351. 1921. (2) RÜBEL, EDUARD. *Geobotanische Untersuchungsmethoden.* (Methods of geobotanical investigation.) xii + 290 p., 1 pl., 69 fig. Gebrüder Borntraeger: Berlin, 1922. (3) PAVILLARD, J. *Cinq ans de phytosociologie.* (Five years of phytosociology.) 30 p. Montpellier, 1922. (4) BRAUN-BLANQUET, J., et J. PAVILLARD. *Vocabulaire de sociologie végétale.* (The terminology of plant sociology.) 16 p. Montpellier, 1922.] *Jour. Ecology* 10: 241-248. 1922.—The leaders of the new school, some of whose names appear in the titles just cited, are the pupils of Schröter of Zurich and of Flahault of Montpellier. They lay special stress upon more accurate methods of analysis of plant associations regarded as social units and upon the concepts connected with these. The reviewer is in sympathy with the principles involved but warns against overdoing formal treatment in too early a stage of the development of plant sociology. He sees greater need of more detailed successional studies combined with investigations of environmental factors. He does not find their grouping of associations desirable. On the other hand he commends the increasing recognition of the genetic principles of the American and English ecologists.—The reviewer characterizes Rübel's work on quantitative methods in ecology as most useful and "written on broad, temperate, judicious lines with very little to criticise adversely." The final paper giving large additions to our ecological nomenclature in French and German is carefully and critically abstracted and English equivalents given for the French-German terminology.—*Geo. D. Fuller.*

3000. [TANSLEY, A. G.] [Rev. of: CLEMENTS, F. E. *Aeration and air content*. Carnegie Inst. Washington Publ. 315. 183 p., 1921 (see Bot. Absts. 11, Entry 1950).] *Jour. Ecology* 10: 122-123. 1922.—The most valuable feature of the book is the emphasis placed on the biological aspects of soil fertility. The conclusion that oil acidity in bogs is a result of deficient aeration is regarded as too simple a statement of the case, and it is thought that too little emphasis is placed on the fact that saturated soils may bear vegetation of 2 distinct types,—hydrophytic and xerophytic.—*Geo. D. Fuller*.

3001. T[ANSLEY], A. G. *Vegetation and climate in the United States*. [Rev. of: LIVINGSTON, BURTON E., and FORREST SHREVE. *The distribution of vegetation in the United States as related to climatic conditions*. Carnegie Inst. Washington Publ. 284. xvi + 590 p., 73 pl. 1921 (see Bot. Absts. 12, Entry 210).] *Jour. Ecology* 10: 252-253. 1922. [See also Bot. Absts. 12, Entry 2997.]

3002. T[ANSLEY], A. G. *A large scale ecological experiment of the war*. [Rev. of: MARSART, JEAN. *La biologie des inondations de l'Yser et la flore des ruines de Nieuport*. [Ecology of the inundations of the Yser and the flora of the ruins of Nieuport.] 22 p., Bruxelles, 1922.] *Jour. Ecology* 10: 237-239. 1922.

3003. TANSLEY, A. G. *The structure, physiology and soil of peat plants*. [Rev. of: (1) PRIESTLEY, J. H., and MILDRED HINCHLIFF. *The physiological anatomy of the vascular plants characteristic of peat*. *Naturalist* 1922: 263-268. 1922. (2) PEARSALL, W. H. *Plant distribution and basic ratios*. *Naturalist* 1922: 269-271. 1922.] *Jour. Ecology* 10: 250-251. 1922.—These are said to be 2 preliminary papers that seem to promise a secure foundation for the development of our knowledge of the ecology of the vegetation of sour peat, a subject hitherto involved in obscurity.—*Geo. D. Fuller*.

3004. T[ANSLEY], A. G. *Maritime soils*. [Rev. of: SALISBURY, E. J. *The soils of Blakeney Point: a study of soil reaction and succession in relation to the plant covering*. *Ann. Botany* 36: 391-431. Fig. 5. 1922.] *Jour. Ecology* 10: 249-250. 1922.—The work is characterized as an important investigation presenting for the first time a full study, with determinations of carbonates, H-ion concentration, and organic matter of sand dune, shingly beach, and salt marsh soils in which habitat and vegetation are correlated with a high degree of accuracy.—*Geo. D. Fuller*.

3005. TROLL, WILHELM. *Über Staubblatt- und Griffelbewegungen und ihre teleologische Deutung*. [Stamen and pistil movements and their teleological significance.] *Flora* 115: 191-250. Pl. 4-6, 1 fig. 1922.—Within the same family (Rutaceae), the same genus (*Lopezia*), or even the same species (*Amaryllis formosissima*) the movements of stamens and pistil may be either autonomous, or induced by light or gravity. There is no evidence that these movements are to be explained on the basis³ of their value in the "struggle for existence."—*A. G. Stokey*.

3006. WERNECK-WILLINGRAIN, H. L. *Der Sortenbau auf Pflanzegeographischer Grundlage*. [Culture of varieties according to the principles of plant geography.] *Mitteil. Deutsch. Landw. Ges.* 37: 723-727. 1922.—In this preliminary report on an extensive study of varieties and species of cultivated plants, begun 23 years ago, the author reviews the fundamentals of plant ecology and shows how the factors controlling the distribution of wild species also operate on cultivated varieties. Several examples are given of varieties of rye to illustrate how the hygrophyl or tropophyl character of the variety determines the region in which it will succeed.—*A. J. Pieters*.

3007. YAPP, R. H. *The concept of habitat*. *Jour. Ecology* 10: 1-17. 1922.—The historical development of the concept of habitat is first discussed and then the factors, both physical and biotic, are examined. Those of the former class are divided into (1) climatic, (2) edaphic, and (3) topographic, and attention is directed to the fact that different growth-forms in the

same community are often growing in very different habitat conditions especially in a stratified community. A habitat is defined as "the place of abode of a plant, a plant community or in some cases even a group or a succession of related plant communities, together with all the factors operative within the abode, but external to the plants themselves."—In classifying habitats the author distinguishes: (1) The successional habitat,—“the changing habitat occupied by an allied group of plant associations which, as a rule, comprise the stages of a normal succession or sere.” (2) The communal habitat,—“the general habitat of any recognizable plant community, such as an association or a society.” (3) The individual habitat,—“the habitat of an individual plant, whether solitary or forming part of a plant community.” (4) The partial habitat,—“the habitat of an individual plant during any given period or stage of existence.” He also expresses the opinion that in ecological research the extensive should as a rule precede the intensive and advocates cooperation in the building up of ecological reference herbaria.—*Geo. D. Fuller.*

STRUCTURE AND BEHAVIOR

3008. ANONYMOUS. **The carrot's crimson eye.** *Gard. Chron.* 72: 54. 1922.—The object of the color of this and other flowers is discussed in its relation to insect visitors.—*P. L. Ricker.*

3009. AGRELIUS, FRANK U. G. **Botanical notes for 1918-1919.** *Trans. Kansas Acad. Sci.* 30: 121-123. 1919/21 [1922].—Unusual seasonal activities, especially flowering after the usual time, are noted for 42 plants in an annotated list. Nine out of 43 twigs listed, when placed in water in the laboratory, had by April 7, 1919, started roots more or less abundantly. Further notes on polycotyledony in the castor bean and tomato are given.—*F. C. Gates.*

3010. AGRELIUS, FRANK U. G. **Botanical notes, 1919-1920.** *Trans. Kansas Acad. Sci.* 30: 234-235. 1919/21 [1922].—An annotated list is given of unusual seasonal activities of 15 plants in the vicinity of Emporia, Kansas, together with further notes on polycotyledony in castor bean and tomato.—*F. C. Gates.*

3011. AGRELIUS, FRANK U. G. **Botanical notes for 1920.** *Trans. Kansas Acad. Sci.* 30: 392-394. 1919/21 [1922].—An annotated list is presented of unusual seasonal activities in 38 plants, together with further notes on polycotyledony in tomato and castor bean seedlings. In the latter it is noted that out of 62 seed of the 1919 crop (2nd generation tricotots) a ratio of about 20 : 1 obtains in comparison with the 264 : 1 ratio the previous year.—The occurrence of a cone of Austrian pine in which the upper third is pistillate and the rest staminate is noted. The specimen was preserved.—*F. C. Gates.*

3012. BAILEY, I. W. **Notes on neotropical ant-plants. I. *Cecropia angulata*, sp. nov.** *Bot. Gaz.* 74: 369-391. *Pl. 1, 8 fig.* 1922.—The author describes the anatomy of a new species of *Cecropia* found in British Guiana. It possesses simple juvenile and large palmately compound adult leaves and commonly has colonies of ants within its hollow stems. Glandular food-bodies were produced on the base of the petioles and these served as food for the colonies of Azteca ants residing within the stem. The ants also maintained within their domatia coccids, which were tended and provided much of the ants' food. Bailey decides that there is no evidence of any advantage to the plant in harboring the ant colonies and that the insect relationship is purely that of parasitism. Little or no protection seems to be afforded from the attacks of leaf-cutting ants, particularly as *Cecropia* is not colonized by the ants until it attains considerable size. The ants seem to prepare feeding places for their coccids and to be solicitous for the welfare of their eggs, larvae, and pupae. He finds no evidence whatever that the glandular food-bodies and the thin prostomata are allurements, acquired by natural selection, for the attraction of colonizing ants. The association of the ants and plants seems merely a most interesting case of parasitism by the former and shows the remarkable adaptiveness of the ants in availing themselves of the peculiarities of special environments.—*Geo. D. Fuller.*

3013. BURKILL, I. H. *Annual report of the Director of Gardens for the year 1921.* Straits Settlements Government Gaz. 1922, Supplement No. 79. 1922.—This is an administration report. The beetle *Protocerus Colossus* having been troublesome, a list of the palms attacked by it is given. In the course of alterations the half of the Lake was run dry, and the mud used as filling elsewhere; the weeds which sprang up on the exposed surfaces are recorded. Some reached flowering in 65 days, others in 80 days. The 65-day plants were, *Jussiaea fissendrocarpa*, *Vandellia crustacea*, *Euphorbia aspera*, and *Panicum indicum*; and the 80-day plants, *Eleusine indica*, *Paspalum conjugatum*, *P. platycaule*, *Ischaemum Ridleyi*, *Cyperus Haspan*, *C. Irya*, *C. umbellatus*, *Kyllingia monocephala*, and *Fimbristylis aestivalis*. Seedlings of *Albizia moluccana*, germinating on the exposed lake-bed, developed bacterial tubercles upon their roots as if the bacteria existed submerged and ready to take advantage of leguminous plants should any appear; but the lake-bed is normally free from any members of the order though Leguminosae occur on its shore.—I. H. Burkill.

3014. SKIPPER, E. G. *The ecology of the gorse (Ulex) with special reference to the growth-forms on Hindhead Common.* Jour. Ecology 10: 24-52. Pl. 1, 9 fig. 1922.—The growth-forms of *Ulex europeus* and *U. nanus* are here considered in detail both as to external and internal anatomy and the results expressed by means of drawings, graphs, and tables of measurements. The former species shows (1) the ordinary type with sun and shade variations and (2) the ericoid with short accessory branches. Both show open and cushion varieties. In *U. nanus* there are recognized 5 types: prostrate, intermediate, erect, aerial-cushion, corymbose.—The author concludes, and presents data proving, that the various parts of the different growth-forms show differences of anatomy dependent upon the degree of exposure. Thus the shade branches show more slender growth, more hairy surface, fewer but larger leaves with fewer but more efficient stomata, a thinner cuticle, and a reduced assimilatory system. The stem of the shade plant possesses a smaller proportion of xylem with a greater range in size of the conducting elements. Similar differences are found between leaves from the interior and exterior portions of the cushion forms, between those of the prostrate and upright branches and in general between the sheltered and the exposed foliage. In general the sheltered form transpires more vigorously than the exposed form, as shown by potometer experiments, although some decided exceptions are encountered. The cushion form appears to be the efficient one for reducing transpiration rate. The ericoid seems to have resulted from a less efficient conducting system, the cause of which remains for the present obscure.—Geo. D. Fuller.

VEGETATION

3015. ALLORGE, PIERRE. *Les associations végétales du Vexin Français.* [Plant associations of the French Vexin.] Rev. Gén. Bot. 33: 481-489, 589-652, 708-751, 792-807. 1921. 34: 71-79, 134-144, 178-191, 251-256, 311-319, 376-383, 425-431, 471-480, 519-528, 564-576, 612-639, 676-701. 1922.—The principal associations dealt with are: (1) plankton; (2) algae and mosses of running water; (3) associations submerged and floating; (4) aquatic herbs with submerged bases; (5) slimes and alluvial gravels; (6) peat bogs; (7) artificial prairie; (8) meadow and xerophilous grasses; (9) meso-hygrophilous woods; (10) mesophilous woods; (11) meso-xerophilous woods; (12) turf woods; (13) heaths and moors; (14) saxicolous; (15) corticolous; (16) murals; (17) ruderals; (18) cultivated plants; (19) mesicolous.—Because of its great edaphic diversity and its geographic position at the edge of the domain of the plains of north-west Europe and at the base of the mountains of central Europe, the French Vexin includes on a relatively small area the majority of associations recognized in western Europe, maritime associations and associations of the high mountains excepted. The phytogeographic characteristics of the French Vexin are exemplified in the Basin of Paris. In spite of the profound transformations imposed on the primitive vegetation by the influence of man, it was possible to find primitive associations. The agricultural activities of man have established highly individualized groups having all the attributes of natural associations. The introduction of foreign species compensates for the floristic impoverishment of the Basin of Paris in autochthonous species. The classic localities do not possess many of the species indicated by the ancient authors, but these species frequently occur in abundance in other localities.

When the influence of man ceases to be exercised at a given point the vegetative groups rarely reconstitute themselves in their primitive form. Cryptogamic plants show remarkable independence of human influence.—The climax mesophytic forest associations in the Atlantic climate have been destroyed or artificially restored.—A. Hayden.

3016. ARRHENIUS, O. A new method for the analysis of plant communities. Jour. Ecology 10: 185-199. Fig. 1. 1922.—Seeking an adequate method for analyzing the composition of plant communities the author examines those already in use and decides that Raunkiaer's is the best, although somewhat lacking in accuracy. He then describes one devised by himself in which the plant population is taken from a belt of suitable width alongside a rope marked in decimeters and meters. The vegetation is divided into an upper and a lower layer, and these are analyzed and charted separately. From the charts of the belt the frequency percentage and the number of individuals per unit area, "absolute frequency degree," are easily calculated. This latter expression permits direct comparisons between various areas even when they have been studied by different individuals, and is one of the major advantages claimed for the method. Other advantages claimed are: convenience, time saving, exact results from even a short belt, a simple expression of the closeness of the community, and a convenient means of analyzing zonation. The mass of vegetation is measured photometrically through the degree of shading.—Geo. D. Fuller.

3017. BARKER, E. EUGENE. A note from the Okefinokee Swamp. Torreyia 22: 104-106. 1922.—A party from the University of Georgia visited Okefinokee Swamp in April, 1922, and made a study of the vegetation between Billey's and Floyd's Islands. Characteristic plants, either wholly or partly submersed, belonging to 14 genera are listed.—J. C. Nelson.

3018. BARKER, M. M., and C. M. GIBSON. Studies of the Somerset turf moors. Jour. Ecology 10: 178-184. 4 maps. 1922.—These turf moors are let out in acre or half-acre holdings for peat cutting. This cutting varies much in depth, ranging from $1\frac{1}{2}$ -6 feet. Within it 2 areas were mapped and studies initiated to answer the question of the condition of the vegetation before and after cutting and drainage were undertaken. Colonization after cutting was found to be most commonly an invasion of the weeds of cultivated lands followed by *Juncus* spp. Later *Juncus communis* and *Eriophorum angustifolium* become more abundant, to be followed by *Myrica gale*, *Molina coerulea*, and *Erica tetralix*. Different variations were found due to the depth of the peat cutting, the vegetation of the surrounding area, and the treatment (grazing, etc.) after cutting. The mapping will permit comparisons at a later date.—Geo. D. Fuller.

3019. CANNON, WILLIAM AUSTIN. Plant habits and habitats in the arid portions of South Australia. Carnegie Inst. Washington Publ. 308. viii + 139 p., 32 pl., 31 fig. 1921.—After an introduction in which is given a list of plants collected (49 genera and 113 species, of which *Kochia Cannoni* J. M. Black is new), the volume opens with a treatise on the physical environment of the vegetation of Australia. This presents physiographic and climatic information and is illustrated by numerous charts. A discussion of the environment, vegetation, and flora of South Australia follows, with detailed consideration of typical regions, such as those of Copley, Ooldea, Tarcoola, Port Augusta, Quorn, the mallee region, etc. Morphological aspects of the xerophytic flora of South Australia are considered, as well as certain structural features of the main perennials and some other forms. The text closes with an account of reactions and adjustments to light, temperature, low water supply, and subterranean environment. A bibliography of about 40 authors is appended.—Burton E. Livingston.

3020. COLLINS, MARJORIE I. On mangrove and saltmarsh vegetation near Sydney, New South Wales, with special reference to Cabbage Tree Creek, Port Hacking. Proc. Linnean Soc. New South Wales 46: 376-392. Pl. 26-32, 11 fig. 1921.—The observations cover Sept., 1916, to June, 1921. This coastal area is characterized by much-branched inlets with deep water close to the shore, drowned river valleys of comparatively recent subsidence. The

region ranges from 33° 50' to 34° 5' S. Lat. Extensive areas of tidal flats are lacking since accumulation of silt is not rapid enough to keep pace with gradual subsidence. The 2 plant formations of the occurring tidal flats are discussed and an account of their developmental phases given. The 1st and outermost is mangrove formation characterized by 2 species: (1) *Avicennia officinalis*, the Australian grey mangrove, growing 15-30 feet in height. This germinates in the fetid deposits of algae, shellfish, and drift, and aids in building up the mud flat. (2) *Aegiceras majus*, a shrub which is not so constant. The leaves in early morning often bear glistening salt crystals. The roots rarely project above the surface.—The 2nd inner formation is salt marsh in which 2 associations of plants are recognized, *Salicornietum* and *Juncetum*. Development groups or associates of *Salicornietum* are often found in zoned arrangement according to slight differences in level. With accretion and attainment of uniform surface level, these associates mingle. Special conditions at Cabbage Tree Creek are described. Here drifting sand has been raising the level of the marsh for some years and has brought about the imposing of one formation upon another. At present the *Juncetum* is invading the *Salicornietum*, which consequently shows signs of arrested development. The occurrence of a dwarf form of *Avicennia officinalis* is recorded. In discussions and a table these tidal flats are compared with those of Great Britain and America. The Australian groupings are in general as follows: A. Mangrove formation. *Avicennia officinalis*, *Aegiceras majus*. B. Saltmarsh formation. (1) *Salicornietum*: (a) *Salicornia-Suaeda* Associates: *Salicornia australis*, *Suaeda australis*; (b) *Salicornia-Spergularia* Associates: *Salicornia australis*, *Spergularia rubra*, *Samolus repens*, *Suaeda australis*, *Mesembryanthemum tegens*, *Tetragonia expansa*, *Atriplex hastata* (*patula*), *Wilsonia Backhousii*; (c) *Sporobolus-Cynodon* Associates: *Sporobolus virginicus*, *Cynodon dactylon*, *Zoysia pungens*, other perennial halophytes. (2) *Juncetum*: *Juncus maritimus*, *Casuarina glauca*.—Eloise Gerry.

3021. COOPER, W. S. The broad sclerophyll vegetation of California: an ecological study of the chaparral and its related communities. Carnegie Inst. Washington Publ. 319. 124 p., 21 pl., 43 fig. 1922.—By using 6 of Adams' criteria for determining centers of distribution and by superposing the ranges of species the ecological range of chaparral is cartographically exhibited and the center of its distribution shown to lie in southern coastal California. Chaparral is dominant in the region with 10-30 inches of rainfall, and in which the precipitation of the growing season is less than 20 per cent of the annual total. The temperature extremes are moderate. In the classification of the broad-sclerophyll communities 2 formations are recognized: broad sclerophyll forest and the chaparral. Under the former are described the following associations and consociations: *Pasania-Quercus-Arbutus*, *Quercus agrifolia-Arbutus*, *Quercus agrifolia*, *Umbellularia*, *Quercus agrifolia-lobata*, *Quercus chrysolepis-kelloggii*, and *Quercus chrysolepis*. Under the latter are recognized the climax chaparral association and the conifer forest chaparral association. These communities are described with respect to their ecological characteristics and floristic content. An intensive study of structure and environmental conditions was made through portions of 2 years in the vicinity of Palo Alto and on adjacent mountains. Figures and tables depict the covering on 6 representative quadrats. Readings of precipitation were made and of soil moisture at 3 depths to 100 cm., with stations in forest and 2 types of chaparral. The roots of *Adenostoma* and *Arctostaphylos* penetrate below 100 cm., at which depth the soil moisture in mid-summer is less than 5 per cent. Soil temperature and evaporation were also measured throughout the year at 3 stations. Chaparral is conclusively shown to be the true climax vegetation for extensive areas of hill and mountain in southern California, and the contention is made that it formerly occupied much of the hill and valley land now covered by grassland or under cultivation. The root distribution, leaf anatomy, and transpiration behavior of the leading chaparral species have also been described.—Forrest Shreve.

3022. FRITSCH, F. E. The terrestrial alga. Jour. Ecology 10: 220-236. 1922.—A review is here given of the recent literature dealing with terrestrial algae. Two communities are distinguished, subterranean and surface. The former includes Diatomaceae, Cyanophyceae, and the more abundant Chlorophyceae with associated moss protonema, while in the latter the

diatoms are largely absent. The importance of the surface communities as pioneer organisms in rock and soil colonization is emphasized as well as the desirability of pursuing a branch of botanical study now in its infancy.—*Geo. D. Fuller.*

3023. GILLMAN, C. An ascent of Kilimanjaro. *Geog. Jour.* 61: 1-27. 4 pl., 2 maps. 1923.—This paper describes the physical features of the south face and states the vertical limits of the belts of vegetation: surrounding plains up to 1,100 m., xerophilous grassland; 1,100-1,800 m., agricultural land formerly tropical rain-forest; 1,800-3,000 m., tropical and temperate rain-forest; 3,000-4,400 m., alpine grass and shrubs; above 4,400 m., alpine desert and glaciers. Vegetational belts occupy lower elevations on Kilimanjaro than on Kenya on account of lower basal elevation of the former. On both mountains the vegetation is much heavier on the south face than on the north, due to greater precipitation. The belt of bamboo found above the forest on Kenya is absent on Kilimanjaro. The paper contains only brief allusions to vegetation.—*Forrest Shreve.*

3024. HOLTUM, R. E. The vegetation of west Greenland. *Jour. Ecology* 10: 87-108. Pl. 3-5. 1922.—After a review of the existing literature on the vegetation of Greenland, the topography and climate are characterized and 2 regions distinguished, separated by the parallel of 62° N. Lat. The northern division has as its climax the heath with the willow scrub as a post-climax on particularly favorable situations, and "fjaeldmark" or fell-field and moss bog as stabilized pre-climaxes. The heath is dominated by *Empetrum nigrum* and *Cassiope tetragona* with *Vaccinium uliginosum* var. *microphyllum*, *Salix glauca*, *Betula nana*, *Phyllodoce caerulea*, *Ledum palustre*, *Rhododendron lapponicum*, and *Loiseleuria procumbens* common and locally abundant. The xerarch succession abounds in mats of lichens invaded by such plants as *Lycopodium selago*, *Pyrola grandiflora*, *Carex* spp., *Saxifraga* spp., and mosses. In the hydrarch succession *Hippuris* and *Menyanthes trifoliata* are the most abundant hydrophytes with sedges dominating the later stages. The other herbaceous associations are also described. The "fjaeldmark" is an open vegetation of isolated flowering plants accompanied by mosses and lichens. It is characteristic of the extreme north and is also the type of vegetation on the nunataks. The moss bogs have cushions composed of many species among which those of *Sphagnum* never seem to predominate.—South of 62° N. Lat., within the July isotherm of 10°C., a scrub forest with trees reaching a maximum height of 4-7 m. is the climax with many of the associations already mentioned as stages in the succession. The tree species are *Betula odorata*, *Sorbus americana*, and *Alnus ovata* together with shrubby *Salix glauca* and *Juniperus communis* var. *nana*. The oceanic climate with its cool and damp summer causes the vegetation of long stretches of the coast to be very uniform in character. Mycorrhizal fungi are abundant both as endotrophic and ectotrophic forms.—*Geo. D. Fuller.*

3025. KOZŁOWSKA, ANIELA. Etude phytogéographique de la région de Miechów. [Phytogeographical study of the district of Miechów.] *Bull. Acad. Polonaise Sci. et Lettres Cl. Sci. Path. et Nat. Ser. B. Sci. Nat.* 1921: 273-286. 1921.—This article gives systematic, ecological, and historical relations of vegetation in the region of Miechów, near Krakow, Poland. In it, are characterized the typical plant associations which are due to the occurrence of various soils in this district and also due to the very interesting topography of this country. The accompanying geobotanic map illustrates the conditions. Special attention is given to the association of steppe plants which is closely connected with light conditions. In the historical section is demonstrated the development of vegetation from the glacial period to the present. All climatic changes known in the Quaternary period left traces in the district of Miechów in the form of plant relics found on the isolated calcareous rocks and in the peat bogs.—*Aniela Kozłowska.*

3026. NORDHAGEN, ROLF. Vegetationsstudien auf der Insel Utsire im westlichen Norwegen. [Studies on the vegetation of the Utsire Island in western Norway.] *Bergens Mus. Aarb. Naturv. Raekke* 1920/1921¹: 1-149. Fig. 1-37. 1922.

3027. OSMASTON, A. E. Notes on the forest communities of the Garhwal Himalaya. Jour. Ecology 10: 129-167. Pl. 8-16. 1922.—In one of the first attempts to classify on purely ecological grounds the forests of a part of northern India there is a linking made between the steppe forest of Tibet and the subtropical forests of the plains. The region under consideration ranges from 2,500 to 15,000 feet in altitude and includes over 2,500 square miles of forested lands, distributed over 4 zones, distinguished as (1) Tibetan with less than 10 inches of annual precipitation, (2) arid, with 10-15 inches, (3) dry, with 15-40 inches, and (4) moist, with 50-80 inches. Five forest formation types are distinguished, described, and divided into associations: (1) Caragana-Lonicera-Artemisia formation, within the Tibetan zone, 9,000-15,000 feet, characterized by shrubs with flexible procumbent branches and deciduous foliage, and by the absence of trees and grasses; (2) Betula-Rhododendron formation, mostly in the dry and arid zones, 9,000-13,500 feet, with more humid atmosphere than the preceding and characterized by rather dense stands of small trees and shrubs with deciduous foliage having various adaptations to retard transpiration. The most mesophytic association is the Betula-Abies, where an open upper story of *Abies Webbiana*, with a height of 60-100 feet, has below it a lower story of *Betula utilis*, 30-50 feet high, and an undergrowth of shrubby *Rhododendron campanulatum* and *Pyrus foliosa*; (3) Pinus-Cedrus formation, in the dry and arid zones, 6,500-12,000 feet, rather xerophytic in appearance, being forests of rather open stands of such conifers as *Cedrus deodara*, *Pinus excelsa*, *Cupressus torulosa*, and *Picea Morinda* together with dicotyledonous deciduous trees that sometimes form a lower story, the undergrowth varying from grasses in the more arid areas to shrubs in the moister situations; (4) Quercus-Abies formation, in the moist zone, 5,000-11,500 feet, a mesophytic forest of good height, *Abies Pindrow*, one of the chief species, ranging from 140 to 200 feet, the dominants being conifers and evergreen oaks but with secondary species largely deciduous, and epiphytic ferns and mosses abundant; (5) Shorea-Anogeissus-Pinus formation, in the moist zone, in valleys up to 6,500 feet, with a subtropical climate and a rather xerophytic aspect, a rather open forest of conifers or trees more or less leafless during the hot weather preceding the monsoon rains, the undergrowth being largely grasses. High temperature and the frequent occurrence of forest fires are factors of importance in this formation and tend to increase its xerophytism. *Pinus longifolia* is the chief tree, often in pure stands, attaining a height of 70-140 feet, and possessing thick bark, excellent coppicing powers and rapid growth while young,—characters that enable it to withstand fires. In addition to the descriptions of the formations much detailed information is contained in the characterization of the associations and in an annotated list of the principal species.—Geo. D. Fuller.

3028. RIGG, GEORGE B. The sphagnum bogs of Mazama Dome. Ecology 3: 321-324. Fig. 1. 1922.—Mazama Dome is situated in Whatcom County, Washington, at an elevation of 6,000 feet. The author visited the region in August, 1921. Bogs occur on benches near the summit, watered by rivulets from the melting snow. One of the bogs studied, typical of the vicinity, formed the south side of a pond. Here in the day time were much light and moisture as well as rather high temperature. The bog association was simple and consisted almost entirely of *Sphagnum* sp. and *Kalmia polifolia*. All the Kalmias seen were less than a foot in height and occurred only in the Sphagnum area. *Vaccinium deliciosum* was frequent in the bog and common in the vicinity. *Phyllodoce empetriformis* and *Lutkea pectinata* were abundant in the vicinity but very little of either entered the bog association. Vegetation was advancing on the pond, sedge and mosses other than *Sphagnum* being the pioneers. The bog association advances only by way of the sedge-moss association. *Sphagnum* was common in the vicinity, occurring in little patches in small, undrained places. In such places *Sphagnum* exercised no selective influence. The flora was the same as in other undrained places, some of which had mosses other than *Sphagnum*; *Equisetum*, *Carex*, and *Veratrum viride* were common in these. The possession of a distinctive flora distinguishes the Sphagnum bogs on Mazama Dome from the Sphagnum areas in the vicinity which lack a distinctive flora.—T. J. Fitzpatrick.

3029. TANSLEY, A. G. Studies of the vegetation of the English chalk. II. Early stages in the redevelopment of woody vegetation on chalk grassland. Jour. Ecology 10: 168-177. Pl.

1, 4 fig. 1922.—In 1909, 2 inclosures were made, with rabbit-proof wire, of grassland at the edge of a wood on the South Downs having areas of 820 and 390 square meters respectively. A portion of the belt of shrubs was included in each case. The woody population of these areas was studied and charted in 1909, 1914, and 1920 and the invasion of the grassland noted. The closed woody vegetation on the edge of the wood had advanced considerably, due mostly to the vegetative growth of *Rubus leucostachys*; the woody colonizers that were numerically most important were found to be *Crataegus monogyna*, *Fraxinus excelsior*, *Rosa* spp., and *Quercus robur*.—Geo. D. Fuller.

3030. [TANSLEY, A. G.] **Forest and prairie.** [Rev. of: (1) VESTAL, A. G. (1) **Local inclusions of prairie within forest.** Trans. Illinois Acad. Sci. 11: 122-126. 1918. (2) **Invasion of forest land by prairie along railroads.** Ibid. 126-128. 1918.] Jour. Ecology 10: 125. 1922.

3031. THOMPSON, H. STUART. **Changes in the coast vegetation near Berrow, Somerset.** Jour. Ecology 10: 53-61. Pl. 1, map. 1922.—The area under consideration is situated along the Bristol Channel, England, where, on account of the high tides, mud flats 4 miles in width are submerged at each tide. These flats were reported by Moss, in 1906, as without vegetation. Now from the development of a new stream tributary to River Parret an area of approximately 100 acres has become covered with vegetation most of which seems to have come in during the past 4 years. Much of this new vegetation is of the salt-marsh type showing its recent origin in the small number of species present, among which *Glyceria maritima* and *Aster tripolium* are conspicuous.—Geo. D. Fuller.

3032. UPHOF, J. C. TH. **Vegetationsbilder aus Kalifornien.** [Vegetation pictures from California.] Vegetationsbilder 14: 22 p., 6 pl. 1922.

3033. WALTON, JOHN. **A Spitzbergen salt marsh: with observations on the ecological phenomena attendant on the emergence of land from the sea.** Jour. Ecology 10: 109-121. Pl. 1, 6 fig. 1922.—A portion of a raised beach in Klaas Billen Bay is described, where the land is rising relatively fast, and a plane-table survey of the area is given in order that changes in later years may be recorded. The zonation from the tidal mud flat to the raised flat showed, (1) *Enteromorpha* with *Glyceria vilfoidea*, (2) *Bryum* sp., (3) mosses and lichens, (4) *Saxifraga oppositifolia*, *Dryas octopetala*, and *Stereocaulon paschale*, and (5) the plants of the former zone together with *Pedicularis lanata*, *Draba alpina*, *Papaver radicum*, and lichens. This last was on the main shingle beach. A somewhat similar zonation on silt and boulder clay was found, culminating in a more swampy type, due to an excess of soil water, in which *Salix polaris*, *Luzula hyperborea*, *Juncus biglumis*, *Polygonum viviparum*, and *Equisetum* were conspicuous. The possible climax of the shingle beach is seen in a Cassiope-heath association. The algal flora of the bay and the brackish pools also has been given some attention.—Geo. D. Fuller.

3034. YAPP, R. H. **The Dovey salt marshes in 1921.** Jour. Ecology 10: 18-23. 1922.—Data are reported of the rate of erosion of pans in a salt marsh studied in 1914. It was found to be slow and the tidal scour to be more effective than wave action. In 1914 a number of pans were artificially drained and it was found that *Glyceria* soon commenced to invade them. The amount of invasion in 1921 is recorded. In one compound pan of 594 square feet area, 387 square feet had been covered with vegetation in 7 years. The appearance of *Spartina Townsendii* is recorded as the first appearance of the plant in that part of Britain.—Geo. D. Fuller.

FLORISTICS

3035. CHRISTY, MILLER. **Primula elatior Jacquin: its distribution in Britain.** Jour. Ecology 10: 200-210. Map. 1922.—The "Bardfield oxlip" is confined in Britain to 2 districts in Cambridgeshire separated by an interval of 20 miles occupied by the River Cam. In addition there are 10 small outlying stands, both the main districts and the outlyers being on chalky boulder clay, the plant being strongly calciphilous. The conclusion is reached that the species is undergoing slow but steady contraction of its area, that this contraction is principally from

the north, that the outlying stands are remnants, and that the contraction is due in some measure to extermination through hybridization with the more potent *Primula vulgaris*.—*Geo. D. Fuller*.

3036. RITCHIE, JAMES. **Naturalization of animals and plants.** [Rev. of: THOMSON, GEO. M. **The naturalization of animals and plants in New Zealand.** $x + 607$ p. University Press: Cambridge, 1922.] *Nature* 110: 868-870. 1922.—New Zealand has presented unusual opportunity for such study since the introduced species have been widely different from the indigenous, and the time is comparatively recent, thus allowing better observation. The author "has been chary of broad generalization, and he has been at endless pains to collect and verify information, much of which in a few years would otherwise have slipped from ken." The book treats each animal and plant in systematic order, more than 600 species of plants being recorded as having become more or less truly wild. Fifty years of close observation lead the author to state that he is "aware of no definite permanent change in any introduced species." Some variations in size and habits are noted, however. The author sees no evidence of the native vegetation being exterminated by the introduced and holds that the former can always hold its own, though its range may be restricted. The reviewer thinks that this limitation often is only a step to ultimate extinction. On the whole, introductions in New Zealand have done more harm than good, and the reviewer suggests that nowhere should naturalization of exotic animals be permitted without the consent of a properly constituted committee containing a strong representation of biological science.—*O. A. Stevens*.

APPLIED ECOLOGY

3037. PEARSON, G. A. **Preservation of natural areas in the national forests.** *Ecology* 3: 284-287. 1922.—A movement has been launched by the Ecological Society of America to secure the preservation of natural areas where conditions may remain undisturbed by human activities. The author discusses the possibilities of the national forests of Arizona and New Mexico as affording areas to be set aside for perpetuation in their natural state. It is suggested that the formal withdrawal of certain sections of the forests under specific provisions as to future care might be accomplished.—*John W. Crist*.

3038. QUAYLE, E. T. **Possibilities of modifying climate by human agency, with special application to south-eastern Australia.** *Proc. Roy. Soc. Victoria* 33: 115-132. 1 map. 1921.—Evidence presented leads to the conclusion that the southeastern states are all under such weather conditions that they will benefit climatically by any considerable increase in surface moisture. The clearing of the land, and the institution of cultivation or pastures for the scrub forests on the inland plains cause some improvement of the rainfall, especially in spring when green growth results in vigorous evaporation. A more general improvement results from irrigation which ensures growth of vegetation throughout the year.—*Eloise Gerry*.

3039. QUAYLE, E. T. **Local rain producing influences under human control in South Australia.** *Proc. Roy. Soc. Victoria*, 34: 89-104. 1 map. 1922.—The author has previously shown for Victoria that (1) the substitution in the Mallee of crops and grass for drought-resistant forest and (2) the instituting of irrigation have a marked effect in increasing rainfall.—The conclusions made are based on the differences in mean rainfall in 1910-1919 and in 1885-1914. The areas with precipitation increased up to 15 per cent are in the lee or south-east of the cultivation or irrigation. The work on Victoria did not fully explain conditions in the neighboring area in South Australia where southeast of Lake Torrens as much as 20 per cent increase in rainfall is shown. Irrigation is negligible as a cause in South Australia, but the settlement of the country has brought about the substitution of crops and grass for the Mallee scrub and this is found to be a contributory reason. Effects are in proportion to the extent of cultivation. The increase in the water supply of the larger inland lakes and salt pans, especially Lake Torrens, is found to be of chief significance. This is attributed to the increased runoff of water at the higher levels where channels are being deepened and former pools have now vanished. Ring-barking is thought to increase the flow of water in

springs and general clearing of the land is found to make permanent flow in previously intermittent streams.—The desirability of purposely further increasing the volume of water in the lakes is pointed out. By clearing hilly land or portions of the inland foothills and mountains suitable for pasture, water which would otherwise evaporate into the air, move east or south without condensation, and so escape, may be obtained for storage in the lakes. It is believed that in the struggle for existence the perennial vegetation, with its adaptations for reduced transpiration, has exceeded its usefulness and that as a consequence gradual contraction of the belt of perennial vegetation toward the inland slopes has occurred.—*Eloise Gerry.*

3040. T[ANSLEY], A. G. **Root systems of crop plants.** [Rev. of: WEAVER, J. E., FRANK C. JEAN, AND JOHN W. CRIST. **Development and activities of roots of crop plants.** Carnegie Inst. Washington Publ. 316. vi + 117 p., 14 pl., 42 fig. 1922 (see Bot. Absts. 11, Entry 4694).] *Jour. Ecology* 10: 239-241. 1922.

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 2961, 2995, 2996, 3020, 3027, 3038, 3039, 3144, 3434, 3456, 3463, 3499, 3518, 3647)

3041. ANONYMOUS. **Commerce du bois. Livraison de bois par l'Allemagne.** [Wood merchandizing. Delivery of wood from Germany.] *Bull. Soc. Centrale Forest. Belgique* 28: 544-548. 1921.—The Belgian Reparations Commission publishes here a letter conditioning the sale of wood furnished by Germany as reparations.—*H. T. Gisborne.*

3042. ANONYMOUS. **Conseil superieur des forêts.** [Superior Council of Forests.] *Bull. Soc. Centrale Forest. Belgique* 28: 470-488, 531-540. 1921.—This is a verbatim report of the meetings held on Jan. 19 and March 17, 1921, by the Superior Council of Forests to consider the proposed law for regulating certain classes of private forests.—*H. T. Gisborne.*

3043. ANONYMOUS. **Les forêts sous sequestre.** [Sequestered forests.] *Bull. Soc. Centrale Forest. Belgique* 28: 427-429. 1921.—A demand is made on the Senate that the government acquire all forests sequestered from alien enemies during the war.—*H. T. Gisborne.*

3044. ANONYMOUS. **Loi autorisant provisoirement le gouvernement à s'opposer à l'exploitation excessive de certains bois et de certaines forêts.** (Fin.) [A law provisionally authorizing the government to prevent excessive cutting in certain woods and forests. (Conclusion).] *Bull. Soc. Centrale Forest. Belgique* 28: 348-361. 1921.—This is the concluding report of the Senate discussions concerning the proposed law which was adopted, and proclaimed Jan. 11, 1921. Arguments for and against are discussed.—*H. T. Gisborne.*

3045. ANONYMOUS. **Report of proceedings of the Australian forestry conference, Brisbane, April, 1922.** 142 p. 1922. [See also Bot. Absts. 12, Entries 3065, 3069, 3093.]

3046. ANONYMOUS. **Service des aménagements.** [Forest management service.] *Bull. Soc. Centrale Forest. Belgique* 28: 541-543. 1921.—This is a tabular report showing by area and districts, from 1885 to 1914, and 1914 to 1920: (1) revised management plans; (2) extent of reserved areas; (3) conversion of ruined woods into coniferous and mixed high forest; (4) conversion of coppice and standards into full high forest; (5) conversion of simple coppice into coppice and standards and into full high forest; (6) lengthening the rotation of coppice and standards; (7) lengthening the rotation of simple coppice; and (8) reducing the period of return in broad leaved high forest.—*H. T. Gisborne.*

3047. ANONYMOUS. Tableau résumant les instructions pour la récolte des graines. [Résumé of instructions for harvesting forest tree seeds.] Bull. Soc. Centrale Forest. Belgique 28: 463-467. 1921.—General rules for all species and separate instructions for each of 23 genera of trees are given.—*H. T. Gisborne.*

3048. ANONYMOUS. The age of gum trees. Jour. Dept. Agric. Victoria 19: 478. 1921.—The article deals with *Eucalyptus globulus*.—*Wm. E. Lawrence.*

3049. A., G. Estimation d'une pineraie incendiée. [Estimating the value of burned pine reproduction.] Bull. Soc. Centrale Forest. Belgique 28: 492-495. 1921.—This article deals with the evaluation of a stand of pine reproduction 9 years old destroyed by fire, for which the owner claims damages.—*H. T. Gisborne.*

3050. ALVIELLA, FELIX GOBLET D'. L'impôt sur les revenus forestiers. Rapport sur l'application des lois coordonnées des 29 octobre 1919 et 3 août 1920 à la propriété boisée. (Impôts sur le revenu.) [The tax on forest revenues. Report on the application of the coordinated laws of October 29, 1919, and August 3, 1920, to wooded (or forest) property. (Taxes on the revenue.)] Bull. Soc. Centrale Forest. Belgique 28: 399-427. 1921.—This description of the new law includes a detailed discussion by foresters of the methods of taxing the soil, the capital invested, and the revenues resulting from both regulated and unregulated forests.—*H. T. Gisborne.*

3051. ANTOINE, V. Restauration des bois exploités pendant l'occupation. [The restoration of woods exploited during the occupation.] Bull. Soc. Centrale Forest. Belgique 28: 451-463. 1921.—The minister of agriculture has called upon the superior council of forests to indicate the cultural, legislative, or other measures helpful in reforesting the areas denuded during the war. The article outlines the problem and the measures, obligatory and otherwise, recommended by the council.—*H. T. Gisborne.*

3052. BENCKE, ALBERT. Die Wiederaufforstung Frankreichs. [The reforestation of France.] Zeitschr. Forst.- u. Jagdw. 53: 692-694. 1921.—Prior to the war France imported about $\frac{1}{2}$ of its timber, today it must import at least $\frac{3}{4}$ of its supply. According to a recent estimate 26 per cent of the land area, 18 per cent of which is now forested, can grow forests. The area of state forests is only 12 per cent. The great regeneration project of 1910, never executed, is now being reconsidered along with the planting of 4 million hectares of denuded land. Several examples are cited of denuded areas successfully regenerated and made very productive.—*J. Roesser.*

3053. BENJAMIN, L. R. Suitability of certain New South Wales eucalypts for paper pulp. Australian Forest. Jour. 4: 369-376. 1921.—*Eucalyptus pilularis*, *E. dalrympleana*, *E. maculata*, and *E. sieberiana* were tested for suitability for paper pulp. Autoclave pulping tests indicated that all 4 species give good pulp, but that *E. pilularis* and *E. sieberiana* are apparently the most suitable.—*C. F. Korstian.*

3054. BRUSH, WARREN D. Utilization of basswood. U. S. Dept. Agric. Bull. 1007. 64 p., 8 pl., 7 fig. 1922.—Basswood has never been a plentiful timber. Its many uses in manufacture and its profitable disposal are fully discussed. Basswood grows rapidly, reproduces easily, and should be encouraged in the basswood region. An appendix contains a classified list of nearly 500 uses of basswood.—*J. T. Buchholz.*

3055. BUTLER, O. M. What forestry means to southern commerce. Amer. Forest. 28: 433-435. 1922.—Of the original stand of saw timber in the U. S. A., only about $\frac{1}{3}$ remain. Of this, 61 per cent lies west of the great plains, 23 per cent in the southern states. Proximity to the great lumber markets and the distance from a strong competing region give the south a commercial advantage unequalled in the history of American lumbering. The south's opportunity is equally great in hard and soft woods. The 9 principal factors favoring wood production in the south are discussed.—*Chas. H. Otis.*

3056. C. A propos d'un mélange d'essences. [Concerning a mixture of species.] Bull. Soc. Centrale Forest. Belgique 28: 468-470. 1921.—This article refers principally to oak stands and recommends mixing beech rather than spruce with oak.—*H. T. Gisborne*.

3057. DENZIN. Die Ergänzungen zur Betriebsregelungs-Anweisung für die preussischen Staatsforsten. [Supplementary instructions of the management-plan instructions for the Prussian state forests.] Zeitschr. Forest.- u. Jagdw. 53: 517-542. 1921.—This critical discussion of the instructions points out the many ways in which they make the work of the official unnecessarily difficult.—*J. Roeser*.

3058. DRUMAU, L. Le mélèze du Japon en Hollande et en Belgique. [Japanese larch in Holland and Belgium.] Bull. Soc. Centrale Forest. Belgique 28: 507-519. 1921.—This recounts the growth of *Larix leptolepis* in Holland, where it has been grown since 1906, and in Belgium, where stock was set out in 1907. Complete measurements of average trees at ages of 15 and 18 years are given.—*H. T. Gisborne*.

3059. DUTT, SHAMBHOO. Annual report on the forest administration in Ajmer Merwara for the year 1918-19. 30 p., Ajmer, 1920.—This report covers in detail the work of the Forest Department in one of the smaller Indian Forest districts. It gives the forest area, lists forest offenses, discusses fire protection and shows the kind of produce taken from the forests. Due to severe drought most of forest area was opened to grazing. The drought did damage to timber, and natural reproduction was poor. A summary for period 1914-15 to 1918-19 is included.—*S. B. Show*.

3060. DUTT, SHAMBHOO. Annual report on the forest administration in Ajmer Merwara for the year 1919-20. 29 p., Ajmer, 1921.—This report discusses forest offenses, forest income, fire protection, and grazing. A severe frost did great damage to trees and especially to reproduction. Experiments in planting, in growing spineless cactus, in development of lac, and in tapping of salar for gum are considered.—*S. B. Show*.

3061. EBERBACH. Die beste Bestandsform und das beste Einrichtungs verfahren? [The best silvicultural form and the best plan of management?] Zeitschr. Forst.- u. Jagdw. 53: 466-474. 1921.—Eberbach replies to Eichhorn's critique of his Ordnung der Holznutzungen, which appeared in 1913. The author defends his advocacy of regular measurement and of inventory as necessary business, of the abolition of rotation and of distinction between final and secondary yields, and his method of calculating the increment.—*J. Roeser*.

3062. ESCHERICH, K. Die Streu fauna. [The fauna inhabiting forest litter.] Forstwiss. Centralbl. 44: 23-29. 1922.—It is of great importance to foresters to understand the nature of the animal life in the forest litter, and its detrimental and beneficial effects on the stand. Pillai's automatic method of separating the animals from the litter is described, and a long list is given of genera found in the litter from conifer forests, some kinds being abundant, others occasional. Seasonal differences are striking; in June there are fewer than in May; the number rises again in July, falls in September, rises in October, and falls in December. The fluctuation is greater, as is also the number of insects, in older stands. Preliminary results show that removal of the litter upsets the natural balance by removing many useful insects, and thereby favors the activities of noxious species.—*W. N. Sparhawk*.

3063. GEIST. Welchen Einfluss hat ein zu tiefer stand der Kiefer auf deren Lebensdauer und Ertrag? [What influence has too deep setting of pine upon its longevity and yield?] Zeitschr. Forst.- u. Jagdw. 53: 690-692. 1921.—This is a study of a sample plot of 0.2 hectare having a stand of pure 54-57 year old pine, started by sowing seed in plow furrows. The side roots were laid bare and their number and depth determined for all diameter classes. The results show the danger of deep furrows and the value of securing shallow rooting, and of manuring with raw humus. They indicate that deep underplowing of the raw humus and

deep setting of trees in plant slits are very dangerous in dry sandy soils; also that thinnings in the lower story only should be made with plow furrows or spot cultures (Platzekulturen), advance growth to be cut out only when diseased or badly formed.—*J. Roesser.*

3064. GILL, A. J. **Bushfire brigades.** Jour. Dept. Agric. Victoria 19: 690-691. 1921.—The author discusses methods of fire fighting and recommends growing maize and potato crops in the more dangerous situations.—*Wm. E. Lawrence.*

3065. GILL, WALTER. **History of the development of the South Australian Pinus insignis forests.** Proc. Australian Forest. Conference, Brisbane 1922: 26-28. 1922.—The introduction of and ultimate returns from these plantations are discussed.—*C. F. Korstian.*

3066. GLORIE, H. **La forêt de Houthulst (fin).** [The forest of Houthulst (conclusion).] Bull. Soc. Centrale Forest. Belgique 28: 335-339. Pl. 1-4. 1921.—This is the concluding article on the documentary history of this forest.—*H. T. Gisborne.*

3067. GOUDIE, H. A. **Eucalypts in New Zealand.** New Zealand Jour. Agric. 24: 229-235, 1922.—Various species of *Eucalyptus*, well suited for afforestation purposes in New Zealand, are described. Care should be taken to select desirable species.—*N. J. Giddings.*

3068. HARTMANN, FRANZ. **Über das Kohlensäureproblem im Walde.** [On the carbon dioxide problem in forests.] Wien. Allg. Forst.- u. Jagdzeitg. 40: 43-45. 1922.—This article supports the view that carbon dioxide concentration is of great importance in forest growth, based upon the facts that the average carbon dioxide concentration of 0.03 per cent is far below the optimum, that an increase of only 0.01 per cent results in stimulated growth, and that the favorable effect is not limited to vegetative growth but extends to seed production. Proof that vigor of growth is dependent upon carbon dioxide content of the air is difficult, for the same factors of moisture, warmth, and litter accumulation which are most favorable to carbon dioxide production are likewise undoubtedly favorable to tree growth. The well known unfavorable effects of undergrowth in forests are claimed to be due to the absorption of the carbon dioxide rising from the ground before it reaches the crowns of the forest trees.—*F. S. Baker.*

3069. HAY, R. DALRYMPLE. **Silvicultural and conversion work in New South Wales.** Proc. Australian Forest. Conference Brisbane 1922: 82-85. 1922.—This is a brief account of progress made in the forestry commission's work in the management and reestablishment of indigenous forests in New South Wales.—*C. F. Korstian.*

3070. HELMS, A. **Plantations in New South Wales: Factors influencing spacing.** Australian Forest. Jour. 5: 11-13. 1922.—The author discusses the effects on shape and growth of individuals in the community, caused mainly by the quantity of light available, and development caused by internal individual characteristics, some species showing a greater form variation than others.—*C. F. Korstian.*

3071. HISS. **Die beste Bestandsform und das beste Einrichtungsverfahren.** [The best forest-form and the best working plan experience.] Zeitschr. Forst.- u. Jagdw. 53: 636-641. 1921.—This is a reply to Eichhorn's critique of Eberbach's booklet "Aus dem Walde," [see Bot. Absts. 11, Entry 2363]. The present management methods are based on the cameralistic conception, founded on a theory of the ultimate performance of the forest. Eberbach's book is the 1st German attempt to prepare a plan based on biological conceptions, or on facts. The forest condition at the beginning and end of every working plan period is the foundation for these methods; the scale which measures the result is the running increment (secured by a stem-to-stem inventory of the growing stock). The biological method is applicable to all forest forms.—*J. Roesser.*

3072. HOWARD, S. H. Volume tables and form factors for sal (*Shorea robusta*) 8 p. Calcutta, 1922.—These are preliminary tables based on the measurement of 817 trees. A discussion of the tables and the various derived figures is included.—*S. B. Show.*

3073. JANACZEK. Beobachtungen anlässlich der Barkenkäferbekämpfung 1921. [Observations on the bark beetle attack of 1921.] Wien. Allg. Forst.- u. Jagdzeitg. 40: 79–81. 1922.—This article discusses fully a destructive outbreak of the bark beetle, *Ips typographus*. The best remedy is to cut and peel trees containing the larvae. The trap tree system is effective. The bark must be burned. Burying 40 cm. deep as an alternative proved ineffective. Careful disposal of slash and tops especially in areas of snowbroken and windfallen timber, is the best preventive measure. "Natural" management, a selection system, and avoidance of clean cutting and planting systems is advocated as a means of maintaining a healthy forest.—*F. S. Baker.*

3074. KARITZKY. [Rev. of: MARTIN, H. Die Fortbildung des sächsischen Forsteinrichtungsverfahrens. (The development of the Saxon forest organization.) 154 p. Paul Parey: Berlin, 1920.] Zeitschr. Forst.- u. Jagdw. 53: 434–439. 1921.

3075. KECK. Dauerwald und Grossbetrieb. [The continuous forest and extensive operations.] Zeitschr. Forst.- u. Jagdw. 53: 632–636. 1921.—In 1908–1910 the forest range of Gertlauken, one of the Lithuanian loam ranges, was seriously damaged by the nun-moth (*Liparis monacha*). The stand consists of spruce in mixture with broad leaf species. The author practiced a form of continuous management under a new plan based on regulation by volume instead of area distribution of age classes. Regeneration secured naturally was supplemented by some planting. Birch and aspen were encouraged in mixture, because of their relative importance at the time. The forest administration, the wood buyers, and the trade accustomed themselves to the distribution of the harvest over the whole area, which was the most difficult factor in the continuous system.—*J. Roesser.*

3076. KIENITZ, M. Wuchsleistung eines 40-jährigen Bestandes von Douglastannen. [Growth performance of a 40-year old stand of Douglas fir.] Zeitschr. Forst.- u. Jagdw. 53: 573–575. 1921.—In 1883, 828 sq. m. in the Chorin forest nursery were planted with alternate rows of 2-year old Oregon Douglas fir and 4-year old nursery grown Norway spruce, with occasional rows of linden. The spruce, soon outgrown, was gradually removed for Christmas trees. No thinning was necessary in the Douglas fir until 1920, when the average breast height diameter was 27.94 cm., and 119.69 cm. were removed in thinning. The fear that Douglas fir and other western American trees will finally fail in Germany even after a good start is not altogether justified. Regardless of the future of Douglas fir stands, their rapid growth and large early yields on fresh loamy soils warrant abundant planting and cultivation, preferably in mixture with spruce.—*J. Roesser.*

3077. KÖNIG. Hacken und Behäufeln. [Hoeing and hilling.] Zeitschr. Forst.- u. Jagdw. 53: 429–430. 1921.—Although the hoeing of pine cultures has been done with success, it has not yet found general usage as it has in oak cultures. In order to obtain the maximum effect, hoeing must be done at the beginning of the regular pre-summer drought as soon as the soil has lost its superficial porosity. The hilling of pine cultures, unlike that of field crops and oak is not beneficial and may even be detrimental. More research work is desirable in the forestry phase of hoeing.—*J. Roesser.*

3078. LEGAT, C. E. Annual report of the forest department for the year ended 31st March 1920, including report on railway sleeper plantations for the same period. Ann.Rept.Forest Dept. Union South Africa 31 p. 1920.—This report discusses the operations of the Department under the following headings: Extension and Constitution of State Forests, Management of State Forests, Financial Results, Administration, Staff, etc. Progress is reported in preparing working plans and in collecting growth and yield data. Silviculture is treated under the

headings: Natural Reproduction, Artificial Reproduction, Drift Sand Operations, Artificial Reproduction in the Indigenous Forests, Cultural Operations, Nurseries and Sales of Seeds, Operations for Improvement of Growing Stocks and Silvicultural Notes. The revenue for the year amounted to slightly more than £131,976, which is 54.6 per cent of the total expenditure. Investigations were initiated as to seasoning and preserving timber.—*C. F. Korstian*.

3079. MADDOX, R. S. **Directions for planting black locust [seed], seedlings and sprouts.** Tennessee Forest. Bur. Circ. 3. 8 p. 1922.

3080. MADDOX, R. S. **Forest fires and your home.** Tennessee Forest. Bur. Circ. 1. 4 p. 1922.

3081. MADDOX, R. S. **Forests, gullies and reconstruction.** Resources of Tennessee 9: 23-31. 1919.—This article gives a brief description of present forest conditions in Tennessee, the causes of and injuries from gullies, and methods of reclamation. The construction of cheap dams of brush is recommended. It is usually desirable to plow off the banks, so the dams may catch the soil more rapidly. The establishment of a vegetative cover is considered. Black locust, Bermuda grass, and honeysuckle vines have so far proved the most successful soil binders.—*C. F. Korstian*.

3082. MARCHET, JULIUS. **Das Forstwesen im Österr. Landeskulturförderungsgesetz.** [Forestry in the Austrian agricultural appropriation law.] Wien. Allg. Forst.-u. Jagdzeitg. 40: 49-50. 1922.—The new law makes an annual appropriation for the next 10 years for forestry purposes, which include education and farmers' conferences; promotion of societies and associations; forest workmen's affairs; animal production, pasture and grazing development; horticulture; forestry proper; watershed protection and torrent control; flood patrol and control. The appropriations are well planned, but gives pure forestry a rather small share of the total.—*F. S. Baker*.

3083. MARCKWORTH, GORDON D. **How forest fires damage the cattlemen.** Tennessee Forest. Bur. Circ. 2. 8 p. 1922.—This is a popular leaflet refuting the fallacious argument that forest fires improve the range.—*C. F. Korstian*.

3084. NECHLEBE, A. **Das forstliche Versuchswesen in der Tschecho-slowakei.** [Forest research in Czecho-slovakia.] Wien. Allg. Forst.- u. Jagdzeitg. 40: 169, 175. 1922.—The necessity for a forest experiment station was emphasized during the nun-moth outbreak of 1917-18. It has now been decided to establish a research force in Czecho-slovakia under 3 heads; one division will specialize on moth control work, the other 2 on silviculture and economics respectively. It is hoped that these may be independent establishments, connected neither with schools nor agricultural experiment stations.—*F. S. Baker*.

3085. PETRIE, W. R. **Tarrietia argyrodendron** (Crow's foot elm or brown oak). Australian Forest. Jour. 5: 9-10. 1922.—The author gives brief silvicultural notes on seed production, germination, and seedling growth.—*C. F. Korstian*.

3086. POSKIN, A. **Observations sur les semences forestières.** [Observations on forest tree seeds.] Bull. Soc. Centrale Forest. Belgique 28: 387-398. 1921.—Results of experiments in storing forest tree seeds by various methods for from 3 months to 6 years are given. The conclusion is reached that "the preservation of forest tree seeds in air-tight containers at low temperatures should be tried by practitioners."—*H. T. Gisborne*.

3087. Q., C. J. **Estimation d'une pineraie incendiée.** [Estimating the value of burned pine reproduction.] Bull. Soc. Centrale Forest. Belgique 28: 552-553. 1921.—The author comments on the methods in a previous article (Sept. 1921), [see Bot. Absts. 12, Entry 3049] concerning the evaluation of a 9-year-old stand of pine reproduction destroyed by fire.—*H. T. Gisborne*.

3088. R., E. *Pineraies de Campine. Eclaircies.* [Thinnings in the pine woods of Campine.] Bull. Soc. Centrale Forest. Belgique 28: 345-347. 1921.—Thinning *Pinus sylvestris* at Campine is described.—*H. T. Gisborne.*

3089. REGINSTER, G. *Excursion forestière en 1920.* [The 1920 excursion of the Society of Belgian Foresters.] Bull. Soc. Centrale Forest. Belgique 28: 519-531. Pl. 1-2. 1921.—This is a detailed description of the forest of Hertogenwald, comprising 11,250 hectares.—*H. T. Gisborne.*

3090. RUZETTE. *Project de loi relatif à la protection de certains bois et de certaines forêt appartenant à des particuliers.* [Proposed law relating to the protection of certain woods and forests in private ownership.] Bull. Soc. Centrale Forest. Belgique 28: 339-344. 1921.—This article shows the necessity for and the justification of a law preventing the devastation of certain classes of privately owned woodlots and forests. The text of the law as passed Jan. 11, 1921 is given.—*H. T. Gisborne.*

3091. SCHRÖDER. *Eindrücke aus dänischem Walde.* [Impressions from Danish forests.] Zeitschr. Forst.- u. Jagdw. 53: 430-434. 1921.—Beech (*Fagus silvatica*) comprises $\frac{3}{4}$ of the forest area of Denmark. Regeneration is secured by sowing in mast years, or by planting 2-year-old seedlings during non-mast years under a very light shelter of old trees, after very intense soil preparation. This system can not be practiced in Germany, because of poorer soil and the danger of frosts, which demands a heavier shelterwood. The Danish method of heavy thinnings in early age would be unfavorable on most German sites and would lead to the formation of poorly shaped boles whose volume increase would not offset the decrease in value.—*J. Roeser.*

3092. SEEHOLZER. *Saumfemelschlag und Blendersaumschlag.* Forstwiss. Centralbl. 44: 125-137. 1922.—Seeholzer explains the distinction between the Bavarian "Saumfemelschlag" and Wagner's "Blendersaumschlag." Characteristic of both are mixed stands, natural reproduction, progressive cuttings in successive strips on the border of the stand, segregation of age-classes, restriction of cutting to small areas, and maintenance of overhead cover. Wagner's method, however, is more or less schematic, requiring cutting in regular parallel strips, whereas the Bavarian method, which leaves the shape and amount of the cut entirely to the forester, is generally characterized by great irregularity in the border strip which is cut over each time. The "Femel" cutting in general is entirely distinct from the "Plenter" (selection) form and the "Schirm" (shelterwood) form. Under a true selection method the stand is never removed, while under the clear cutting (Kahlschlag), shelterwood (Schirmschlag), and Femelschlag methods the stand is removed in one or several operations and replaced by a new one. In these the stand is the unit of management, while with selection cutting the individual tree is the unit. Wagner's method is incorrectly named, because it does not result in a selection forest (Plenterwald).—*W. N. Sparhawk.*

3093. SIMON, M. H. *The financial bases of silviculture and agriculture.* Proc. Australian Forest. Conference, Brisbane 1922: 129-130. 1922.—A comparison is made between agriculture and forestry on "scrub" land in Queensland. The original crop should be realized on to the fullest extent prior to the launching of silvicultural operations having in view the reforestation of an area. Objection is raised to deducting revenue from the disposal of the old crop for the cost of planting the new crop.—*C. F. Korstian.*

3094. STÅLFELT, M. G. *Till Kännedomen om Förhållandet mellan Solbladens och Skuggbladens Kolhydratsproduktion.* [Relation between carbohydrate production of sun leaves and shade leaves.] Meddel Statens Skogsförsöksanst. 18: 221-280. Fig. 1-16. 1921.—Tests were made with leaves of *Acer platanoides*, *Pinus sylvestris* and *Picea excelsa*. In the 1st, sun leaves exhibit much higher photosynthetic activity than shade leaves. Thickness of the leaf as well as area must be considered, as thick leaves produce more carbohydrate than

thin. Considering the mass of tissue involved, leaves of medium thickness are most efficient. When exposed to the same light intensity both sun and shade leaves of pine show higher photosynthetic activity than those of spruce. In nature, the spruce makes up for this deficiency by a greater mass of needles. Spruce is able to persist in much less intense light. In both pine and spruce assimilation increases with light intensity, attaining maximum activity in full sunlight. Broadleaf trees generally attain maximum output of carbohydrates in medium light intensities. This difference is attributed to the fact, shown by Lubimenko, that pine and spruce needles contain a relatively low proportion of chlorophyll. The same limitation apparently renders pine and spruce unable to respond to increases over the normal proportion carbon dioxide in the atmosphere. Shade leaves of both pine and spruce are relatively more efficient than sun leaves in a given light intensity, which is explained by the higher chlorophyll content of the shade leaves. Assimilation is strongly dependent on soil moisture. During a protracted drought in June and July, when transpiration was reduced to within 12 per cent of normal in spruce and to a somewhat higher figure in pine, assimilation practically ceased in the former and fell to a very low figure in the latter. After heavy rains both transpiration and assimilation rose abruptly. The cessation of assimilation is attributed to the closing of the stomata in order to check water loss. (Summary in German).—*G. A. Pearson.*

3095. STOATE, T. N. **Silvicultural notes: *Pinus insignis* VIII.** Australian Forest. Jour. 5: 8-9, 75-76. 1922.—The author discusses protection against atmospheric agencies and grazing animals, rabbits, hares, wallabies and wombats, deer, bandicoots, mice, and birds.—*C. F. Korstian.*

3096. STUBENRAUCH. **Forstliche Plauderei. [Forest gossip.]** Zeitschr. Forst.- u. Jagdw. 53: 406-423. 1921.—Problems causing most contention in forestry concern the care of forest stands through thinnings and the natural and artificial establishment of such stands. Volume calculation based on light thinnings and increment as influenced by fertility are considered. Light thinnings in uneven-aged stands under continuous management and in even-aged stands are discussed. The even-aged forest is a better producer of quantity and quality than other forest forms. The determination of the financial rotation under the present Prussian management is also discussed.—*J. Roeser.*

3097. TRESCKOW, VON. **Forstwirtschaftlicher Rückblick auf die Jahre 1919/1920. Review of forest economics for the years 1919-20.** Zeitschr. Forst.- u. Jagdw. 53: 581-616. 1921.—The author considers the economic situation, its effect on the wood market and on building operations, state forest management and exploitation, the depressing import possibilities from neighboring states, questions of organization, legal provisions, and silvicultural questions, such as the argument over the relative merits of systems occasioned by Möller's "continuous management" in pine, and the bettering of the structure of forest organization. Heavy inroad into the growing stock will be necessary, but this should be counterbalanced by replacement, cultivation, and increasing production.—*J. Roeser.*

3098. WILBRAND. **Der wilde Kirschbaum. [The wild cherry tree.]** Zeitschr. Forst.- u. Jagdw. 53: 641-644. 1921.—The great demand for fuel has led to the reduction of many tree species, notably the wild cherry, which, after walnut, is the most important and desirable furniture wood. The wild cherry regenerates easily, is very tenacious, and individual trees of 185 and 172 cm. breast height diameter have been measured, the former in close association, with, but not suppressed by, a 264 cm. oak. The wild cherry should be brought back by natural and artificial means because of its timber value and aesthetic value, and its fruit.—*J. Roeser.*

3099. WILBRAND. **Staatliche Forstgesetze und der Grosswaldbesitz. [State forest laws and ownership of large forests.]** Zeitschr. Forst.- u. Jagdw. 53: 542-553. 1921.—To prevent destruction of private forest lands and to secure unified organization, state laws and super-

vision are desirable. A plan is outlined for state control of the personnel and management of large private forests, especial emphasis being given to the regulation of the yearly cut and adherence to the limitation. Using statistics from Hessian forest management, Chr. Müller, opposed to state control, shows that the income from private forests is greater than from state forests. This is due, primarily, to a greater production cost and a larger unit outlay for roads in the state forests. The author contends that the state is looking ahead by making salvage cuttings, getting rid of unproductive material, and spending liberally and wisely for artificial restocking.—*J. Roeser.*

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 2915, 2917, 2918, 2922, 2938, 2946, 2947, 2949, 2954, 2977, 2990, 3005, 3011, 3035, 3036, 3304, 3306, 3312, 3313, 3318, 3347, 3349, 3350, 3417, 3431, 3435, 3470, 3581, 3599, 3606, 3613, 3619)

3100. ANONYMOUS. A new *Dahlia* of interest to plant breeders. *Jour. Heredity* 11: 48. 1920.—This new *Dahlia*, *D. Popenovii*, is thought to be the ancestor of the cactus-flowered Dahlias.—*Edith Lang.*

3101. ANONYMOUS. Cross fertilization of wheat. *New Zealand Jour. Agric.* 24: 88-89. 1922.—The possible effect of slight frost injury to stamens, as related to cross fertilization, is discussed.—*N. J. Giddings.*

3102. ANONYMOUS. The inheritance of size. *Nature* 110: 463. 1922.—This general review of recent experiments indicates that size inheritance is due to independent multiple factors. Hybrid vigor increases the size of the 1st generation following a cross. Measurements of rabbits, subsequent to the crossing of races of divers sizes, support the conclusion that size is controlled by general growth factors which are correlative in effect; while certain species crosses in *Oenothera* illustrate that size factors, local in effect, occur in plants. The presence of non-inherited size differences has been demonstrated with the deer-mouse.—*H. W. Feldman.*

3103. ANONYMOUS. [German rev. of: BECKER, J. *Grundlagen und Technik der gärtnerischen Pflanzenzüchtung*. (Principles and technique of horticultural plant breeding.) 400 p., 149 fig., 17 col. pl. Paul Parey: Berlin, 1922.] *Zeitschr. Pflanzenzücht.* 8: 445-447. 1922.

3104. ANONYMOUS. [Rev. of: MENDES CORRÊA, A. A. *Homo (Os modernos estudos sobre a origem do homem)*. (Man: Recent studies on the origin of man.) 318 p. Lumen Empresa Internacional: Lisboa, Porto, Coimbra, 1921.] *Nature* 110: 510. 1922.

3105. ANONYMOUS. [German rev. of: PRITCHARD, F. *Development of wilt resistant tomatoes*. U. S. Dept. Agric. Bull. 1015. 18 p., 10 pl. 1922 (see Bot. Absts. 11, Entry 2893).] *Zeitschr. Pflanzenzücht.* 8: 436. 1922.

3106. ANONYMOUS. [German rev. of: SALAMAN, R. and J. LESLEY. *Genetic studies in potatoes; sterility*. *Jour. Agric. Sci.* 12: 31-39. 1 fig. 1922.] *Zeitschr. Pflanzenzücht.* 8: 439. 1922.

3107. ANONYMOUS. [German rev. of: WECK, R. *Über Bewertung bei Selektionsarbeiten*. [The value of selection.] *Fühling's Landw. Zeitg.* 71: 134-139. 1922.] *Zeitschr. Pflanzenzücht.* 8: 444. 1922.

3108. ANONYMOUS. [Rev. of: WERTH, E. *Der fossile Mensch; Grundzüge einer Palä-anthropologie*. *Erster Teil*. (Fossil man: Basis of paleo-anthropology. Part 1.) iv + 336 p. Gebrüder Borntraeger: Berlin, 1921.] *Nature* 110: 508-509. 1922.—The author depends

largely upon the methods and conclusions of Schwalbe and Klaatsch. No mention is made of remains found at Piltown, Boskop, Talgai, or Wadjak, but full accounts are given of 2 discoveries in Germany during war-time,—one at Ehringsdorf, near Weimar, the other at Obercassel near Bonn. The former is rightly attributed to Neanderthal man and the latter is regarded as Cromagnon.—*O. A. Stevens.*

3109. ANDERSON, E. G. **Heritable characters of maize XI—Fine streaked leaves.** Jour. Heredity 13: 91-92. 2 fig. 1922.—A number of maize plants grown in 1917 showed fine white streaks in the leaves, somewhat resembling the lineate leaves described by Collins and Kempton. These cultures were closely related. Out-crosses with unrelated green plants gave normal green plants in the F_1 , and less than 25 per cent streaked plants in the F_2 . The factor for fine-streaked leaves is apparently linked with that for white endosperm, as no yellow seeds ever produced fine-streaked plants.—*R. C. Cook.*

3110. ANDERSON, W. S. **Sterility in relation to animal breeding.** Kentucky Agric. Exp. Sta. Bull. 244. 201-234. 1922.—Many farms within a radius of 25 miles of the Kentucky Experiment Station are devoted to raising 1 of the 3 breeds of light horses or some other breeds of registered stock. A study of sterility of male and female breeding animals has been conducted during the past 9 years.—I. Sterile males. Microscopic examination of semen and results of matings were used in determining fertility of males. A complete lack, a decreased number, or reduced vigor of motion of spermatozoa, or admixture of pus cells with spermatozoa are all indications of sterility. In some instances a male may at first discharge semen entirely free from spermatozoa but on a second mating a few minutes later discharge perfectly normal semen. Nineteen examples of sterile males are given which represent the types of male sterility worked with: (1) fibroid degeneration of the testes; (2) repeated attacks of orchitis; (3) production of a large percentage of inactive sperms; (4) presence of pus in the semen due to an inflammation of some portion of the genital tract. Proper feeding and exercise has resulted in some sterile males again becoming fertile.—II. Sterile females. Less than half the mares bred in Kentucky in any year raise foals to maturity the next year. Some of the causes of barrenness in mares and jennets are: (1) breeding at the wrong period of heat; (2) abnormal discharges in the female tract resulting in rapid inactivation of the sperms; (3) irregular heat periods due to inflammation and final destruction of the ovaries; (4) indifferent mares or mares which fail to catch at the first mating may pass 2 or 3 periods without showing signs of heat, possibly due to physiological conditions resulting from the care of foal. It is good practice to breed a mare that has just foaled, on the 7th and 9th or on the 8th and 10th days after foaling.—III. Artificial insemination. Methods are described of collecting semen. It is not safe to extract semen from a served mare for use with another mare because of the possibility of transferring disease. Usually it is not satisfactory to divide the discharge of a male between 2 or more females as in doing so the chances of a successful mating are reduced. The chief value of the syringe is to catch all available semen and inject it into the female. This method has proved the most efficient yet devised to insure the impregnation of a valuable brood mare.—*W. D. Valleau.*

3111. ANDERSON, W. S. **The effect on the germ plasm of isolation in a mountain section.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics, and the family. 297-302. Williams & Wilkins Co.: Baltimore, 1923.—Two families about 100 years ago took possession of a broken and unproductive strip of land in the foot-hills of the Kentucky mountains. One family was afflicted with chorea, the other family was feeble-minded. The 2 families have intermarried; now in the 5th generation there are about 150 families. In $\frac{3}{4}$ of these families there is chorea in some form or other. The disease has become intensified with each new generation owing to isolation which has encouraged cousin marriages. The feeble-minded tendency of the original stock seems also to have been intensified by the same intermarriages and the present generation has less energy, ambition, and ability than any of the previous generations. The most unfortunate feature of the affliction is the early and severe onset of the chorea as it has been manifest in the last 2-3 generations, in some instances appearing in childhood or in early

manhood, and in some of these cases assuming the form of complete mental irresponsibility along with the customary lack of muscular control. As a whole the women are very productive although the primitive conditions under which they live and the lack of care exercised by the mentally deficient mothers causes a very large infantile death-rate.—*W. S. Anderson.*

3112. BAGG, HALSEY J. **Disturbances in mammalian development produced by radium emanation.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 150-167. Williams & Wilkins Co.: Baltimore, 1923.—Two groups of female white rats were treated. In 1, the animals were injected intravenously or subcutaneously at varying periods before and after mating, with solutions of the active deposit of radium emanation. The usual dose was 5 millicuries. In the 2nd group pregnant females at nearly full term were treated with gamma-ray radiation from an amount of radium emanation equivalent to about $1\frac{1}{2}$ gm. of radium metal. The source of radiation was placed 1 cm. from the ventral body wall of the animal, and 2 mm. of lead and 1 mm. of silver were used as a filter. Doses of about 1,300 millicurie hours were used in this group. The results for the intravenous or subcutaneous treatments were similar, as shown by the arrested development of the foetus. Following treatment after mating, many embryos were killed and absorbed, or aborted. Many other effects are detailed. It would seem that by treatment of the mother before mating the faculty of the later developing embryo to form proper blood vascular endothelium is interfered with. When pregnant females at nearly full term were irradiated with gamma rays approximately $\frac{1}{2}$ of the young of each litter died 10 days after the treatment. The condition and symptoms of the young are described. Interesting developmental arrests were noted in the other half of the litters that survived the treatment. Although the animals grew to normal size, they soon showed abnormal eyes, with opaque pupils and the entire organ generally deformed. The abnormal animals were sterile in both sexes. They showed no neurological disturbances, and yet at autopsy marked developmental arrests were noted in the differentiation of the brain. The neopallium was greatly reduced in some cases and the cortex largely missing in others. The gonads of these animals were greatly atrophied and degenerated, although the other viscera showed no pathological changes.—*Halsey J. Bagg.*

3113. BANKER, HOWARD J. **The ideal family history.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 306-311. Williams & Wilkins Co.: Baltimore, 1923.—The author argues for a centrifugal type of family-history study as the only form based on correct biological principles and supplying the greatest interest to the greatest number of the family.—*Howard J. Banker.*

3114. BANKER, HOWARD J. **The learned blacksmith—an aristogenic type.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 340-347. Williams & Wilkins Co.: Baltimore, 1923.—A pedigree study is reported of Elihu Burritt showing the incidence of intellectual ability in his family network.—*Howard J. Banker.*

3115. BANNER, J. P. [Dutch rev. of: TÄCKHOLM, GUNNAR. *Zytologische Studien über die Gattung Rosa.* (Cytological studies on the genus *Rosa*.) *Acta Horti Bergiani* 7: 103-381. 1922.] *Genetica* 4: 544-550. 1922.

3116. BANTA, ARTHUR M., and L. A. BROWN. **Some data on control of sex in Cladocera.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 142-149. Williams and Wilkins Co.: Baltimore, 1923.—The writers found evidence that under favorable laboratory conditions parthenogenetic reproduction may continue indefinitely without resort to sexual reproduction. Thus the long-accepted internal sexual cycle seems non-existent for this material; environmental influences are held responsible for such irregular and sporadic sexual forms as occur. Indirect evidence that sexual forms, males and sexual (ephippial) eggs,—are called forth by certain environmental factors was seen in the occurrence of sexual forms in *Cladocera* in an outdoor pond and simultaneously among other types of *Cladocera*, reared in the laboratory in culture water from the same pond. Direct evidence has been

obtained that environmental factors influence the production of males. The simple expedient of crowding the mothers causes the production of males among a population usually wholly female. In most of these experiments there are few crowded bottles in which males fail to appear and it is exceptional to find males from mothers in any of the control bottles. A satisfactory measure of sex control was obtained for every strain adequately tested. This involved 3 species of *Moina*, 3 of *Simocephalus*, and 1 of *Daphnia*.—A. M. Banta.

3117. BARKER, L. F. The relation of the endocrine glands to heredity and development. *Science* 55: 685-690. 1922.—Secretions of the endocrine or so-called ductless glands have a profound effect upon the development of the individual. Such pathological conditions as gigantism, goitre, diabetes, and others, are known to be due to abnormal functioning of these glands. Tadpole metamorphosis may be accelerated by feeding thyroid and retarded by feeding thymus. Whether these secretions may not also affect the germplasm merits investigation. On the other hand, that conditional influences may so affect the secretions of the glands that they in turn modify the germplasm in such a way that the conditional influence is inherited, appears to be merely a conjecture without supporting evidence.—P. C. Mangelsdorf.

3118. BAUR. Einige Aufgaben der Rebenzüchtung im Lichte der Vererbungswissenschaft. [Some grape-breeding problems in the light of genetic knowledge.] *Beitr. Pflanzenzucht* 5: 104-110. 1922.—The author recommends the production of wine grapes resistant to *Peronospora viticola* and *Uncinula (Oidium) Tuckeri* by crossing the better kinds of *Vitis vinifera* varieties with the disease resistant American grape species. Methods of procedure which should be followed to secure the desired results are given. The paper is followed by numerous comments [p. 110-118].—Richard Wellington.

3119. BECHER, ERICH. [German rev. of: HERTWIG, OSKAR. Zur Abwehr des ethischen, des sozialen, des politischen Darwinismus. (A defense of Darwinism, ethically, sociologically and politically.) 121 p. Gustav Fischer: Jena, 1921.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 200-202. 1922.

3120. BEDWELL, C. E. A. Eugenics in international affairs. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 427-429. Williams & Wilkins Co.: Baltimore, 1923.—The author believes that the establishment of permanent national and international organizations, to carry on the work of the 1st International Eugenics Congress, London, 1912, would foster such a spirit of cooperation among the nations as would tend "to offset dangers of unrestrained ambition" and might prove to be more effective than disarmament, arbitration, and the League of Nations. As the primary object of eugenics is the improvement of race, there is a very wide field of investigation, involving problems not only of international health, but also of racial differences in connection with race migration and influence of race on human history, the possibility, by wise crossing, of perpetuating dying races and of levelling up backward races without the advanced being debased, etc.—The policy of cooperation with the League of Nations, Pan American Union, and with existant research associations is strongly advocated.—C. B. S. Hodson.

3121. BELLING, JOHN. The attraction between homologous chromosomes. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 84-95. Williams & Wilkins Co.: Baltimore, 1923.—A brief account is given of some microscopical work with the *Daturas* bred by A. F. Blakeslee, and with *Cannas*. Homologous chromosomes in the late prophase or metaphase of the reduction division in pollen mother cells were, with rare exceptions, in connected sets of 2, 3, 4, and 5, according to the number concerned. This was found in diploids, triploids, tetraploids, diploids with 1 or 2 extra chromosomes, and tetraploids with 1 extra chromosome.—John Belling.

3122. BERNSTEIN, CHARLES. Microcephalic people sometimes called "pin head." Jour. Heredity 13: 30-39. 3 fig. 1922.—The article describes a family of 10 children, 4 boys and 1 girl being microcephalic and 5 apparently normal. The oldest girl graduated from normal school and is a successful public school teacher.—Pictures of 2 microcephalic girls not related to each other or to the Pin family are shown.—The family chart shows a history of 5 generations and the connection of these microcephalic children to the general family tree, which shows little degeneracy or dependency. The only marked causative factor of degeneracy is chronic alcoholism, which is very prevalent in a considerable number of the family fraternity.—Charles Bernstein.

3123. BLAKESLEE, A. F. Variation in the Jimson weed (*Datura Stramonium*) caused by differences in the number of chromosomes. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics, and the family. 82-83. Williams and Wilkins Co.: Baltimore, 1923.—The author discusses the balanced and unbalanced chromosomal types in *Datura* and gives a table of those already observed.—M. E. Farnham.

3124. BLARINGHEM, LOUIS. Mosaïque héréditaire chez le pois (*Pisum sativum* L.). [Heredity mosaic in the pea.] Compt. Rend. Acad. Sci. Paris 175: 1432-1434. 1922.—Seed of intermediate color have been obtained from a green pea which originally came from the yellow Pariser Gold. These intermediate seed segregate into a majority of intermediates with graduated variations from yellowish white to dark green. The extent of segregation of the intermediate forms seems to depend upon certain conditions of growth. Mosaic heredity in the pea is influenced by the age of the plant and the climate in which it is grown.—H. C. McPhee.

3125. BLARINGHEM, L. Sur la paedogénèse du chanvre (*Cannabis sativa*). [On paedogenesis in *Cannabis sativa*.] Bull. Soc. Path. Veg. France 9: 290-294. 1922.—Flowers may occur in the axils of the 3rd or 4th leaf of juvenile plants of *Cannabis sativa* grown in the hot-house. Seed obtained from these flowers are smaller than those obtained later from the adult plants, but may contain normal embryos.—J. Dufrenoy.

3126. BLARINGHEM, L. Sur la résistance aux parasites cryptogamiques d'un hybride d'épeautre et de seigle. [Disease resistance of a hybrid *Triticum spelta* [var. T.] × *Secale cereale*.] Bull. Soc. Path. Veg. France 9: 266-276. 3 fig. 1922.—The hybrid is (1) a giant, the vegetative tissues of which retain juvenile characters and weigh 8 times more (air dry) than those formed by either parent; (2) sterile; (3) much more resistant than the parents to *Puccinia graminis*. Infestation by *Claviceps* is favored on ovaries of the hybrid, which are exposed for a very long time. However, ergots were not numerous on hybrids.—J. Dufrenoy.

3127. BLARINGHEM, LOUIS. Sur un hybride stérile d'épeautre et de seigle. [On a sterile hybrid of spelt and rye.] Compt. Rend. Acad. Sci. Paris 175: 635-637. 1922.—Five kernels were obtained from emasculated flowers of spelt (*Triticum spelta* L.) pollinated with rye (*Secale cereale* L.) pollen. The author claims that the effect of the foreign pollen, xenia, was apparent in these kernels. Five sterile F₁ plants were produced. These were taller than the parents and produced about 8 times as much dry matter per plant as the larger parent. The characters of the hybrid were in part paternal, but especially maternal,—the characters of organization being maternal, the superficial and ornamental being paternal. The flowers remain open for a considerable time, being incapable of fertilization with spelt or rye pollen, while their own stamens are empty.—C. E. Leighty.

3128. BLUHM, AGNES. [German rev. of: BILSKI, FRIEDR. Ueber Blastothorie durch Alkohol. Mit Versuchen am Frosch. (On blastothorie caused by alcohol. With experiments on frogs.) Arch. Entwicklungsmech. 47: 4. 1921.] Arch. Rass.- u. Ges.-Biol. 14: 357. 1922.

3129. BLUHM, AGNES. [German rev. of: DAVENPORT, C. B. (1) Influence of the male in the production of human twins. *Amer. Nat.* 54: 122-129. 1920 (see Bot. Absts. 5, Entry 345.) (2) Heredity of twin births. *Proc. Soc. Exp. Biol. and Med.* 17: 75-77. 1920. (3) Influence of the male in the production of twins. *Med. Rec.* 1920: 1-10. 1920 (see Bot. Absts. 8, Entry 1071).] *Arch. Rass.- u. Ges.-Biol.* 14: 197-199. 1922.

3130. BLUHM, AGNES. [German rev. of: GLANZMANN. Hereditäre hämorrhagische Thrombasthenie. Ein Beitrag zur Pathologie der Blutplättchen. (Hereditary haemorrhagic thrombasthenia. The Werlhof blood-spot disease.) *Jahrb. Kinderheilk.* 88: 1-42, 113-141. 1918.] *Arch. Rass.- u. Ges.-Biol.* 14: 201-203. 1922.

3131. BLUHM, AGNES. [German rev. of: GUYER, M. F. Immune sera and certain biological problems. *Amer. Nat.* 55: 97. 1921.] *Arch. Rass.- u. Ges.-Biol.* 14: 191-193. 1922.

3132. BLUHM, AGNES. [German rev. of: LITTLE, C. C. Note on the occurrence of a probable sex-linked lethal factor in mammals. *Amer. Nat.* 54: 457-460. 1920 (see Bot. Absts. 7, Entry 910).] *Arch. Rass.- u. Ges.-Biol.* 14: 193-194. 1922.

3133. BLUHM, AGNES. [German rev. of: PEARL, R. (1) The effect of the war on the chief factors of population change. *Science* 51: 553-556. 1920. (2) A further note on war and population. *Science* 53: 120-121. 1921 (see Bot. Absts. 10, Entry 114).] *Arch. Rass.- u. Ges.-Biol.* 14: 203-205. 1922.

3134. BLUHM, AGNES. [German rev. of: STOCKARD, C. R. Developmental rate and structural expression. An experimental study of twins, double monsters and single deformities and the interaction among embryonic organs during their origin and development. *Amer. Jour. Anat.* 28: 15. 6 pl., 32 fig. 1921.] *Arch. Rass.- u. Ges.-Biol.* 14: 188-191. 1922.

3135. BLUHM, AGNES. [German rev. of: STOCKARD, C., and C. PAPANICOLAOU. Further studies on the modification of the germ-cells in mammals. The effect of alcohol on treated guinea-pigs and their descendants. *Jour. Exp. Zool.* 26: 119-226. 1918 (see Bot. Absts. 1, Entry 501).] *Arch. Rass.- u. Ges.-Biol.* 14: 350-355. 1922.

3136. BOLLES, C. B. Creating new dahlias—a garden sport for every man. *Gard. Mag.* 36: 32. 1922.—As all new forms have been obtained from seedlings, the possibilities of obtaining new forms of merit from seedling selections seems very great. The necessity of using seed of desirable varieties and the value of controlled crosses is emphasized.—H. K. Hayes.

3137. BOND, C. J. Sex of Irish yew trees. *Nature* 110: 810. 1922.—All *Taxus fastigiata* trees observed are female; no male plants are known. It is believed all Irish yews are grown by cuttings from the original mutational form found a century ago in Fermanagh, Ireland. The author is interested in possible linkage of erect habit of growth with femaleness; also the effect of pollinating female Irish yew with *T. baccata* yew pollen. He has made the cross, *Taxus fastigiata* × *T. baccata*. The F₁ shows graded series from spreading (baccata) type to erect (fastigiata) type. They are too young to determine sex.—J. Ben Hill.

3138. BOWDITCH, HAROLD. Red-green colorblindness in three allied families. *Jour. Heredity* 13: 136-142. 1 chart. 1922.—The inheritance of the defect is traced in the families for 6 generations, and while nothing new is brought out, the truth of the accepted law of inheritance is illustrated.—R. S. Cook.

3139. BRAUN, K. Bemerkungen zur Verbesserung der Sisalagave durch Züchtung. [Suggestions for the improvement of the sisal agave by breeding.] *Zeitschr. Pflanzenzücht.* 8: 278-290. 1922.—The author refers to preparations made before the World War for improvement experiments with sisal agave in the former German colony in East Africa. The ideal

plant he had aimed to work for was a long-lived one (to have been selected from those that delayed blooming longest), with at least 160 leaves averaging 170 cm. or more in length. He had planned also to make use of the established fact of individual diversity in percentage of fiber. Attention was to have been paid to selection for resistance to adverse conditions.—*J. P. Kelly.*

3140. BREEZE, M. S. G. Degeneration in anthers of potato. [Abstract.] Rept. British Assoc. Adv. Sci. 1921: 462-464. 1921 [see Bot. Absts. 11, Entry 1304.]

3141. BREITENBECHER, J. K. A red-spotted sex-limited mutation in *Bruchus*. Amer. Nat. 57: 59-65. 1923.—The female of *Bruchus quadrimaculatus* has 4 black spots on the elytra; the male is not spotted. A dominant mutation alters the color of the spots in the female to red, and leaves the male unaffected. This is the 4th dominant sex-limited mutation found in the species.—*Conway Zirkle.*

3142. BREMER, G. Opmerkingen over het cytologisch onderzoek van suikerriet. [Remarks on the cytological investigation of sugar cane.] Arch. Suikerindust. Nederland.-Indië 30: 229-238. 3 fig. 1922.—A popular exposition is presented of the more important results of the research published in full elsewhere [see Bot. Absts. 12, Entry 406].—*R. D. Rands.*

3143. CÄMMERLOHER, HERMANN. Zur Frage der Heimat der Banane. [The original home of the banana.] Oesterreich. Bot. Zeitschr. 71: 262-266. 1922.—The author reviews the literature pertaining to the native habitat of the banana and points out that it has been given both an Asiatic and a South American origin. Since he found excellent relief figures of the banana, *Musa sapientum*, upon the Tempel Borobudur (Java), which is over 1100 years old, and since its name is of Sanskrit derivation, he concludes that the banana came originally from the tropics of the Old World.—*Richard Wellington.*

3144. CHAPMAN, H. H. A new hybrid pine (*Pinus palustris* x *Pinus taeda*). Jour. Forest. 20: 729-734. 1 pl. 1922.—An unusual type of pine, supposedly a hybrid, was found in 1915 by V. H. Sonderegger in Winn Parish, Louisiana, ranging southwest to Calasieu Parish. It occurred scattered at widely separated points. *P. palustris* is probably the female parent. Seed germination is in the autumn as in *P. palustris*. The juvenile foliage is similar to that of *P. palustris*, while the rapid growth and habit of the seedling resemble the *P. taeda* parent. The cones are intermediate between the parent species. Fully developed seed are formed by the hybrid but their fertility was not determined. The wood structure is like that of *P. taeda*. It yields high in naval stores. The name *Pinus Sondereggeri* is suggested for the hybrid. It has commercial possibilities in reforestation.—*J. Ben Hill.*

3145. CHRISTY, MILLER. The origin of the hybrid *Primula elatior* × *vulgaris* demonstrated in the field, with notes on other British *Primula* hybrids. New Phytol. 21: 293-300. 1922.—Intermediates were found between: (1) *P. elatior* and *P. vulgaris*, (2) *P. elatior* and *P. veris*, and (3) *P. veris* and *P. vulgaris*. The author concluded that they represented hybrids between these species. He planted *P. vulgaris* in a bed of *P. elatior*, the nearest *P. vulgaris* being 2 miles distant. Hybrids of the same type as those noted above were found in the same region 17 years later. The other hybrids were not produced in this manner. Of these the supposed hybrid between *P. elatior* and *P. veris* is rare. The range of intermediates between *P. veris* and *P. vulgaris* and the fact that they are very vigorous and semi-sterile indicate strongly that hybridization in the wild also accounts for this case.—*Margaret C. Mann.*

3146. CHRISTY, MILLER. The pollination of the British *Primulas*. Jour. Linn. Soc. Bot. 46: 105-139. 1922.—After surveying the evidence of insect visitation to 3 yellow species of *Primula* belonging to the section *Vernales*, i.e., the British primrose, oxlip, and cowslip, the author reverts to Darwin's conclusion that pollination must be due to night-flying moths. All but 5 species of Noctuidae and Geometridae known to be present when these early flowering

primroses are in bloom were eliminated because they alone had tongues long enough to reach nectar in any of the species involved. The author's conclusion is based on the following: (1) the heterostylism must be for the purpose of cross-fertilization and such insects as visit these species by day frequently enough to effect pollination would be indiscriminate in their effects; (2) one of the 5 possible species has been seen to visit a cowslip; (3) pale yellow flowers are most visible at night; (4) nectar guides of type found in flowers so pollinated are present in all 3 species; (5) scent of primroses is most noticeable at dusk. It is suggested that the question be definitely settled by experiment.—*Margaret C. Mann.*

3147. CLAUSEN, J. **Studies on the collective species *Viola tricolor* L. II.** Bot. Tidsskr. 37: 363–416. *Illus.* 1922.—Variations in the following characters in *V. tricolor* and *V. arvensis* are described, named, and illustrated: size of petals, labellum of stigma, spot on style, pollen-magazine, honey-streak, color of petals, length of spur, form of spur, form of spur-bearing petal, lateral sepals, epidermal cells of petals, pollen grains, size of leaves, form of leaves, stipules, end lobe of stipules, habit of plant, color of stem, duration of life.—That these variations are induced by genotypical differences is affirmed by observation in nature, cultivation of types under the same conditions, and by breeding experiments.—That all combinations of these variations are possible is indicated by tabulation of sets of 4, 5, or 6 characters at a time for many plants from various habitats.—That the many different isoreagents (microspecies) within the collective species *V. tricolor* L. have arisen from crosses between *V. tricolor* and *V. arvensis* and between segregants, is shown by: (1) analysis of progeny of natural populations and of segregants; (2) synthesis of mixed populations similar to wild populations by crossing *V. tricolor* and *V. arvensis*; (3) cytological evidence. All relevant and stabilized types of *V. tricolor* and *V. arvensis* have respectively 13 and 17 chromosomes (haploid). Nuclear divisions in artificial hybrids and in suspected spontaneous hybrids are very similar. When 13 *V. tricolor* chromosomes and 17 *V. arvensis* chromosomes are brought together they behave in different ways in the heterotypic metaphase. They can form either 15 bivalents, 14 bivalents and 2 univalents, or 13 bivalents and 4 univalents, the 2nd arrangement being most frequent. As no *V. tricolor* with less than 13 (haploid) are found it seems that gametes with less than that number and zygotes with less than 26 degenerate. This new type of chromosome distribution after crosses resembles that found in the F_2 of Winkler's cross *Solanum nigrum*, diploid \times tetraploid. As usually only 2 numbers, 13 and 17, occur in nature, the chromosome sets of hybrids must be unstable or plants with these combinations do not survive in nature.—That naturally occurring combinations of variations (isoreagents) should not be considered as "species" is argued from the fact that the number of these combinations is very large even when limited to homozygotic combinations. Also, some already named varieties and sub-varieties can be identified as segregants from *V. tricolor* \times *V. arvensis*. Search for expected combinations in nature was successful. All this is believed to show how little reason there is in the modern splitting up of Linnaean species, as illustrated by *Hieracium* with 1400 "species." While this course leads to chaos, the old division of species is not regarded as sufficient. Hence the following propositions are made: (1) that species be maintained in the Linnaean sense but as superior to varieties, microspecies, and isoreagents; (2) that species, so used, be critically revised with new diagnoses not including varying characters, the latter listed below with known combinations; (3) that minor units be named microspecies (Ostenfeld, 1921) and isoreagents (Raunkiaer, 1918), forma to be applied to variations caused by external conditions solely; (4) that ternar nomenclature be used for microspecies and isoreagents.—*V. tricolor* and *V. arvensis* must be regarded as distinct species, although they intercross, because: (a) chromosome numbers are distinct; (b) 2 well defined types are far more frequent than transition types; (c) hybridization does not result in simple Mendelian segregation because of the chromosome situation.—The only guide as to original *V. tricolor* and *V. arvensis* types is the frequency of character combinations in nature; Geographically they are co-extensive.—Distribution of isoreagents follow definite limitations of environment, e.g., degree of soil acidity.—Adaptation of certain microspecies to peculiar environmental complexes is explained not as a direct effect of the conditions but as the result of mutations, crosses, and subsequent selection.—*E. B. Babcock.*

3148. COCKERELL, T. D. A., and DOROTHY YOUNG. A mutation of the columbine. *Nature* 110: 701. 1 fig. 1922.—A single plant of *Aquilegia coerulea* James was found near Ward, Colorado, which had the sepals deeply trifold.—O. A. Stevens.

3149. COOK, O. F. Are any species uniform? Or should the assumption of "pure" species be discarded and diversity recognized as the normal evolutionary condition? *Jour. Heredity* 13: 285-287. 1922.—There appears to be no doubt as to the existence of "impure" or heterozygous species. There is considerable doubt however regarding the existence of species that may accurately be called "pure" or uniform. Taxonomists' ideals of uniformity differ from those of geneticists and evolutionists. Species which the taxonomists consider pure are often very heterozygous. The author believes that species cannot originate by sudden mutations but only by gradual modifications in the network of descent.—P. C. Mangelsdorf.

3150. COOPER, H. P. The inheritance of the spring and winter growing habit in crosses between typical spring and typical winter wheats, and the response of wheat plants to artificial light. *Jour. Amer. Soc. Agron.* 15: 15-25. 1923.—In both direct and reciprocal crosses between true spring and true winter wheats, the short vegetative period is dominant. Crossing of a spring type (Marquis) and 3 winter types shows that there is a dominant factor for winter and an inhibitor against winter involved, for there resulted a ratio of approximately 13 spring to 3 winter forms. By artificially lengthening the daily duration of light, it is possible to grow 2 generations of spring grains in 1 year.—F. M. Schertz.

3151. CROWTHER, C. R. Evolutionary faith and modern doubts. *Nature* 109: 777. 1922.—The author criticises Bateson's statement [see Bot. Absts. 12, Entry 1767] that "The conclusion in which we were brought up, that species are a product of a summation of variations, ignored the chief attribute of species, that the product of their crosses is frequently sterile in greater or less degree." The author thinks it easier to imagine sterility arising from a gradual modification spread over a length of time, and involving many chromosomes, than from the half monstrous variations chiefly studied by Bateson, variations which appear to affect only a few chromomeres, and those by loss alone.—Walter Scott Malloch.

3152. DANFORTH, C. H. The frequency of mutation and the incidence of hereditary traits in man. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 120-128. Williams & Wilkins Co.: Baltimore, 1923.—Several well-known hereditary traits are clearly detrimental to their possessors. Others, while not obviously detrimental, are almost certainly not beneficial. The incidence of these traits must depend on the frequency of their determining genes in the racial germ-plasm, and since there is good evidence that some of them have appeared from earliest times, the incidence, at least of the adverse traits, must be maintained by occasional mutations. Among hereditary traits that are presumably indifferent the incidence varies in different racial groups. This racial difference implies a different rate of mutation in different human strains, and this rate can be estimated roughly by taking into account the length of time since 2 or more racial stocks diverged from a common source. Estimated in this way it seems probable that in some directions mutations have occurred in not more than 1 gene in 30,000 while in other directions the mutations have apparently been more frequently. The indications are that parallel mutations appear in different races, but that a more or less pronounced tendency toward a certain type of mutation may itself be a racial characteristic.—C. H. Danforth.

3153. DARWIN, LEONARD. Aims and methods of eugenical societies. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 5-19. Williams & Wilkins Co.: Baltimore, 1923.—The aims of eugenical societies are discussed in general terms. All proposals made should be based on heredity. Rules of conduct in regard to parenthood, and methods of stimulating conduct productive of racial progress are to be considered. Eugenics is the advocacy of social reforms based on genetics. Only general principles can now be laid

down in regard to many problems. Moral principles are to be kept in the foreground. Eugenic reform is unlikely to be rapid. Ways in which the aims can be promoted are cited.—*Leonard Darwin.*

3154. DARWIN, LEONARD. **The field of eugenic reform.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 189–202. Williams & Wilkins Co.: Baltimore, 1923.—Some eugenists would cover a wider field than others. When dealing with single factor qualities, to prevent parenthood might eliminate the evil but could not raise the general standards. In such cases individuals must be selected; as also with criminals, wastrels, etc. Segregation and sterilization are discussed. With multiple factor qualities, individual selection is less effective. Reforms should deal with large numbers. Correlation between infertility and superiority leads to deterioration. The questions of a moral campaign in favor of fertility, financial burdens, motherhood endowment, and state aid to the inefficient are considered.—*Leonard Darwin.*

3155. DAVENPORT, CHARLES B. **Research in eugenics.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics, and the family. 20–28. Williams & Wilkins Co.: Baltimore, 1923.—This gives the history and the needs of, and some of the results already obtained, in research on human heredity. In addition are discussed (with some practical application) mate selection, fecundity, and influence of immigration on national traits.—*C. B. Davenport.*

3156. DAVIDSON, DORIS. **The inheritance of ability.** [Rev. of: TERMAN, L. **The intelligence of school children.** 317 p. Houghton Mifflin: Cambridge, Massachusetts, 1919.] Jour. Heredity 13: 124–126. 1922.—Terman's book is a study of 41 children rating exceptionally high in intelligence tests. Family histories were given in all instances. In 72 cases the occupation of the father is given, who in 18 is a professional man and in 17 a college graduate. In only 2 cases is it stated that there were no relatives of superior intelligence on either side of the family.—*R. C. Cook.*

3157. DONCASTER, L. **Further observations on chromosomes and sex-determination in *Abraxas grossulariata*.** Quart. Jour. Microsc. Sci. 66: 397–408. 1922.—This paper was completed after Doncaster's death by his assistant, RUTH C. BAMBER (MRS. BISBEE). In a previous paper (Jour. Genetics 4: 1. 1914) the inheritance of a tendency to produce families consisting chiefly or entirely of females was described. Females of the strain had 55 chromosomes as the somatic number; all males and most other females had 56. In maturation of the 55-chromosome strain, 28 pass to one pole and 27 to the other. Since all spermatozoa had 28 it seemed evident that the egg with 27 must be female-determining. The above observations were supported by Morgan on *Phylloxera*. The extra chromosome seemed to go into the polar body—though in *Phylloxera* these eggs always became males. In later work published in a letter to Nature (June 10, 1915) Doncaster did not seem to bear this out. Two questions are at issue: (1) whether the all-female families are so because all the fertilized eggs are truly female, or whether they arise through non-viability of male zygotes; (2) if all zygotes in such families are female, whether egg-nuclei before fertilization contain always 27 chromosomes, sometimes 28. There is no evidence regarding the first. Evidence from the use of various stains indicates that a certain amount of chromatin is left behind on the equator of the spindle in anaphase. If so, perhaps the sex-chromosome loses so much chromatin that it becomes useless; hence the all-female families from eggs, some of which contain 27 and others 28 chromosomes.—*C. S. Hoar.*

3158. DOWN, E. E., and O. B. WINTER. **Selecting mother sugar beets.** Quart. Bull. Michigan Agric. Exp. Sta. 5: 36–38. 1 pl. 1922.—The mother sugar beets with higher sugar content may be recognized by the specific gravity method, as there is a fairly close correlation between high specific gravity and high sugar content. The method outlined is one that has long been known in Germany. The writers point out the necessity of storing and handling the mother beets in a uniform, careful manner if the method outlined is to be of much value.—*H. K. Hayes.*

3159. DUBLIN, LOUIS I. **Mortality of foreign race stocks.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 78-89. Williams & Wilkins Co.: Baltimore, 1923.—Studies made of the mortality rates in the various race stocks in Pennsylvania and New York show important differences in the several groups. The native born of native parentage have the lowest mortality rate and the foreign born, the highest. The foreign born and the native born of foreign or mixed parentage agree much more closely with each other than with native stock.—Of the foreign born groups, the Russians, who are mostly Jews, the Italian, and the Austro-Hungarians present the most favorable conditions. The British, the Germans, and the Irish have death rates very much in excess. Pulmonary tuberculosis, pneumonia, and the degenerative diseases are largely responsible for this unfavorable mortality of the 3 stocks last named.—The figures appear to indicate that the immigrants of New York State and Pennsylvania are not representative of the most vigorous in their own races, the death rates being often higher here than in their own countries.—*Louis I. Dublin.*

3160. DUCK, R. W. **Mendelism in fur sheep crosses—II.** Jour. Heredity 13: 63-68. 4 fig. 1922.—In a previous paper [see Bot. Absts. 11, Entry 3830] it appeared that the black fur of the homozygous Karakul sheep was dominant to the white of the Longwool. A discussion of the appearance of occasional red lambs in Karakul \times Longwool crosses was reserved for a later paper. It appears that the natives of Transcaspia, the home of the Karakul, conduct their sheep breeding operations carelessly and that mixing with the red-wooled breeds, also found in that region, is almost certain to occur. Data from breeding experiments at the Dawley Farm, Fayetteville, New York, are presented to substantiate the theory that the supposed homozygous Karakul rams are really heterozygous for red. An account is also given of a peculiar 6-horned Karakiev ram. Breeding experiments indicated that the character was entirely lacking in dominance,—not appearing in the F_1 progeny.—*R. C. Cook.*

3161. DUNN, L. C. **Some results of race mixture in Hawaii.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 109-124. Williams & Wilkins Co.: Baltimore, 1923.—This paper presents the preliminary results of a study of the physical anthropometry of Hawaiians of pure and mixed bloods. Hybridization between native Hawaiians and other races exists in incipient stages, most of the hybrids observed being of the 1st generation and very few further removed than 2 generations from the original cross (F_2 or backcross). Of the race mixture involving Hawaiians as 1 element, about 57 per cent in the sample of 344 cases was attributable to crosses with 1 of the white races, chiefly North European and Portuguese; about 31 per cent involved crosses of Hawaiian and Chinese; only 2 per cent involved Hawaiian and Japanese; and the remaining 10 per cent consist of crosses with other stocks: Negro, American Indian, Philipino, Malay, Hindoo, etc. The commonest triracial mixture was Hawaiian-Chinese—"White."—The south Chinese (coolies from Quantung) proved the purest of any of the racial groups involved in the crosses and the most conservative in all characters; they differ from the native Hawaiians in head form, stature and its segments, nose shape, hair form, and other characteristics. In a small number of hybrids most of these characteristics were intermediate between the parent types (e.g., stature); in some they resembled the Chinese (e.g., hair form), and in others presented an appearance different from either parent race (e.g., head form). The production of new types from this and similar racial crosses by recombination and segregation of heritable factors is briefly discussed.—*L. C. Dunn.*

3162. DUNN, L. C. **The relationship between the weight and the hatching quality of eggs.** Connecticut [Storrs] Agric. Exp. Sta. Bull. 109. 89-114. 1922.—A total of 545 eggs laid by 47 White Leghorn pullets and 170 eggs laid by 18 White Leghorn hens were weighed and incubated. Average-weight eggs hatched better than either large or small eggs. No correlation was found between the weight of an individual bird's eggs and the percentage of fertile eggs that hatched. A slightly greater hatchability was found in the eggs weighing less than the mean than in those weighing more than the mean.—*F. A. Hays.*

3163. EHRENBERG, PAUL. **Die Wirkung der Ernährung auf die Entstehung von bleibenden Veränderungen der Pflanzen.** [The effect of nourishment on the origin of permanent changes

in plants.] Beitr. Pflanzenzücht. 5: 45-67. 1922.—The author cites the influence of environmental factors, acting through the nutrition, upon the morphology and physiology of plants and offers evidence which he believes indicates that the induced changes are inherited. Thus, by appropriate external stimuli, the normal biennial habit in beets may be changed to the annual habit, and *vice versa*. Since both annual and biennial races of beets are known, the 2 methods of flowering must be inherited. Hence, the author believes, it is reasonable to suppose that when a change in the time of flowering is brought about by artificial stimuli, hereditary changes at the same time have been induced through alterations in the nutrition. From similar lines of argument, but without detailed evidence from pedigreed cultures, it is believed that increased relative weight of straw to grain in wheat under irrigation, and increased number of ears in maize under favorable weather conditions, as well as certain other modifications brought about by the environment, are to be classed as induced changes which are hereditary. In the discussion following the address [p. 67-71] W. OETKEN, PH. STOLL, and SPERLING speak of the effect of cold upon time of flowering, and KOSTLAN, ROEMER, and SEELHORST of the length of time necessary to induce hereditary changes.—A. F. Blakeslee.

3164. EMOTO, YOSHIKADZU. Über die relative Wirksamkeit von Kreuz- und Selbstbefruchtung bei einigen Pflanzen. [The relative effectiveness of cross- and self-fertilization on several plants.] Jour. Coll. Sci. Tokyo Imp. Univ. 43⁴: 1-31. 2 pl., 6 fig. 1920.—This paper discusses the relative effectiveness of cross pollination as compared with selfing by pollen from the same flower or other flowers on same plant. The plants studied were *Primula sinensis*, *P. obconica*, *Brassica campestris*, *Tricyrtis hirta*, *Hyacinthus orientalis*, *Freesia leichtlini*, and *Tritonia aurea*. Cross pollination yielded most seeds in all species. It was also most effective in a majority of species in respect to number of capsules set, size of capsule, weight of seeds, and percentage of germination.—L. L. Burlingame.

3165. ESTABROOK, ARTHUR H. The tribe of Ishmael. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 398-404. Williams & Wilkins Co.: Baltimore, 1923.—The Tribe of Ishmael is a large group of degenerates descended from several hundred family heads, with the Ishmael family itself the central and most degenerate. These people have lived mostly in Indiana and the neighboring states. The different families of the Tribe came to Indiana, separately in most cases, on the general tide of immigration west from the original colonies. There is reason to assume that some of these families came from the convicts deported by England to America in early times. The pauper and criminal families which comprise the Tribe number about 10,000 people. Many have been inmates of institutions, receive poor relief, and live by begging. Many are feeble-minded. There are 3 outstanding characteristics of the Tribe: pauperism, licentiousness, and gypsying. Some families or individuals in new communities have mated into new stocks and some improvement is found where the mating has been into a stock carrying better traits and abilities. The matings in general however have been like to like with a resulting poor offspring which in turn has shown a low social reaction. The story is much like that of the Jukes and other defective families.—A. H. Estabrook.

3166. EWART, J. COSSAR. Sheep breeding experiments in Scotland. British Res. Assoc. Woolen and Worsted Indust. Publ. 14. March, 1922.—The author summarizes briefly the probable origin of the European breeds of sheep. He holds that the short-tailed primitive breeds, such as the Soay and Shetland, were derived from crosses between the Mouflon and Urial and that the long-tailed breeds are derived largely from varieties of the Ammon and the fat-tailed and fat-rumped sheep of central Asia. He describes the results of first crosses between the Highland Blackface and Southdown sheep, between Blackface and Soay, Blackface and Siberian-Shetland.—Sewall Wright.

3167. EYSTER, WILLIAM H. Inheritance of zigzag culms in maize. Genetics 7: 559-567. 1922.—Zigzag culms is an abnormality of maize in which some of the internodes are shortened, thickened, and twisted. This abnormal condition is recessive to the normal form and results

from the interaction of 2 factors designated *Zg zg* and *Zz*. One of these factor pairs *Zg zg*, is very closely linked with a chlorophyll disorder known as green-striped leaves and designated *Gr gr*.—*J. H. Kempton*.

3168. EYSTER, W. H. The intensity of linkage between the factors for sugary endosperm and for tunicate ears and the relative frequency of their crossing over in microspore and megaspore development. *Genetics* 7: 597-601. 1922.—The average per cent of crossing over between the 2 linked characters of maize, Tunicate, *Tu tu*, and sugary endosperm, *Su su*, has been determined to be 28.63 ± 0.45 . While the degree of linkage between these characters is variable, there is no appreciable difference between the rate of crossing over in microsporogenesis and megasporogenesis, a condition found with other linked characters in maize.—*J. H. Kempton*.

3169. FELDMAN, H. W. A fourth allelomorph in the albino series in mice. *Amer. Nat.* 56: 573-574. 1922.—A new mouse mutant has been obtained from a fancier who had been breeding it for some time. It resembles the ruby-eyed guinea pig, ruby-eyed rat, and ruby-eyed or chinchilla rabbit in the degree of pigment reduction in the hair; but the eyes are apparently darker than those of the rat and guinea pig. This mutation forms one of a series of quadruple color allelomorphs in the mouse, and the author designates it as *c*. In a scale of dominance, the 4 forms probably fall in the following order: intense or wild color *C*, dilute *c'* (herein described), extreme dilute *c^d*, and complete albinism *c*. Wild color, *C*, is completely dominant to other allelomorphs, but *c'* and *c^d* are incompletely dominant to albinism. The cross between *c'* and *c^d* has not yet been made, but the heterozygote (*c' c^d*) will probably be intermediate in color.—*B. W. Johnson*.

3170. FERGUS, E. N. Self-fertility in red clover. *Kentucky Agric. Exp. Sta. Circ.* 29. 17-36. 1922.—A review of literature on self-sterility of red clover is given which indicates that red clover is generally considered self-sterile although occasional seed may set under bags. Preliminary tests of a method of artificial self-pollination, which consists in rolling the heads between thumb and fingers, indicated that this method was efficient in causing self-pollination. Approximately 650 heads, each representing a separate plant, were artificially self-pollinated by this method. From 32 of these plants 153 seed were secured, several producing many seed. All of the seed were sown and the following year 79 normal plants were obtained. Artificial self-pollination was performed on 463 heads, of which 115 set seed yielded an average of 9.0 seed per head. A single plant produced 134 seed in 5 self-pollinated heads. The self-pollinated seed obtained were from the progeny of 13 of the original 32 plants which set seed. Strains which produced many seed in the 1st self-pollination tests were generally highly self-fertile in the next generation. Four strains produced some chlorophyll-deficient seedlings, which is considered evidence of self-fertilization. Greater uniformity was noted between the selfed progeny of individual plants than between the progeny of individual open pollinated plants. The 5 progeny obtained by self-pollination from 1 parent plant were all highly resistant to mildew.—*W. D. Valleau*.

3171. FETSCHER. [German rev. of: BAUER, J. *Vorlesungen über allgemeine Konstitutions- und Vererbungslehre*. (Lectures on the "human constitution" and heredity.) iv + 186 p., 47 fig. Julius Springer: Berlin, 1921.] *Arch. Rass.- u. Ges.- Biol.* 14: 195. 1922.

3172. FISCHER, G. Originalsaatgut und Vermehrungsanbau. [Original seed stock and culture for increase of the stock.] *Zeitschr. Pflanzenzücht.* 8: 295-308. 1922.—Marked differences in powers of increase of various plants prevent an arbitrary designation of some particular generation from the originally selected parent as the original seed stock ("Originalsaatgut"). Inquiry revealed that in 21 cases out of 37, the 5th generation of seed from the initial selection was sold as original seed stock. The author also discusses selling diverse generations from the originally selected parents as original seed stock, restoring original seed stock in increase establishments, and the advisability of inserting "elite increase plots" between the breeding farms and the increase establishments.—*J. P. Kelly*.

3173. FISHER, R. A. **Darwinian evolution by mutations.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 115-119. Williams & Wilkins Co.: Baltimore, 1923.—Many misapprehensions have arisen as to the bearing of modern research on the Darwinian theory of natural selection. It is here contended that, apart from changes in the use of words, the only serious point in which Darwin's views require modification is that Darwin appears to have considered that the ordinary differences between parent and child are due to new mutations occurring afresh in each generation, whereas modern work shows that mutations are of infrequent occurrence, and that the differences commonly observed are due for the most part to the rearrangement, on the Mendelian scheme, of old heritable differences long incorporated in the species. It is shown that this fact does not at all diminish the efficacy of natural selection. The conditions under which new genes become incorporated in the genetic stock of the species are discussed; and the conclusion is drawn that the utility of sexual reproduction with Mendelian inheritance lies in the fact that it allows a wide genetic variation with a minimum of mutation.—*R. A. Fisher.*

3174. FISHER, R. A. **New data on the genesis of twins.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 195-197. Williams & Wilkins Co.: Baltimore, 1923.—Attention is called to (1) the importance of the evidence supplied by twins of inheritance of human traits, (2) inconsistency of current biological theories of the genesis of twins with twin measurements published by Thorndike, which constitutes the only available numerical data. Thorndike's measurements suggest a uniform type of origin for the majority of twins, intermediate between the supposed "fraternal" and "identical" types. The supposition that twins are alike in maternal inheritance but not necessarily in paternal inheritance has definite Mendelian consequences by which it may be tested. Such cases as are available in albinism, eye color, and other, probably Mendelian, traits appear to support this supposition. The number of cases at present available are admittedly inconclusive but afford grounds for further inquiry.—*R. A. Fisher.*

3175. FISHER, R. A. **The evolution of the conscience in civilized communities (in special relation to sexual vices).** 2nd. Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 313-317. Williams & Wilkins Co.: Baltimore, 1923.—The evidence for the inheritance of mental and moral qualities which has been adduced by modern work in psychology, statistics, and genetics is confirmed by the historical facts of the evolution of moral opinion in civilized communities. In the case of the mental attitude towards practices limiting population, the selective agency may be indicated, and the change of moral opinion traced in successive ages. As examples, are taken female infanticide of the pre-Moslem Arabs, and the abortion in the Greek and Roman civilization. Effects of these selective agencies are still apparent in modern vital statistics, and they should be borne in mind in discussing modern contraceptive practices.—*R. A. Fisher.*

3176. FISHER, R. A. **The systematic location of genes by means of crossover observations.** Amer. Nat. 56: 406-411. 1922.—The author develops a method of calculating the most probable values for linkages ("distances") of any set of closely adjacent genes (genes between which double crossing-over is negligible) from results of any series of experiments involving various combinations of these genes. The chance of getting the entire result actually obtained (1) is the product of the chances for each individual in the counts having been what it was, the chance of an individual being a cross-over in the first distance being represented as p_1 , the chance for a cross-over in second distance as p_2 , etc. The problem then is to find values of p_1 , p_2 , etc., at which the chance of getting the entire result obtained is a maximum. The latter is maximum when its derivatives with respect to p_1 , p_2 , etc., are 0; also when these derivatives of its log = 0, which is a more practicable expression. Logarithmic derivatives of (1), equated to 0, are therefore to be solved for p_1 , p_2 , etc. This gives nonlinear equations (equations involving powers higher than the first of the variables p_1 , p_2 , etc.) but linear approximations may be obtained from these by expanding them according to Taylor's theorem, and using only those terms in the expansion which involve first or zero powers of p_1 , p_2 , etc; (higher powers become

negligible here on the assumption that real values of p are not very different from the experimental). The simultaneous linear equations thus obtained are:

$$\begin{aligned} a_{11} p_1 + a_{12} p_2 + a_{13} p_3 & \dots\dots\dots = b_1 \\ a_{21} p_1 + a_{22} p_2 + a_{23} p_3 & \dots\dots\dots = b_2 \\ a_{31} p_1 + a_{32} p_2 + a_{33} p_3 & \dots\dots\dots = b_3 \end{aligned}$$

where a_{11} is the sum of the values $\frac{(\text{total individuals})^2}{\text{crossovers} \times \text{non-crossovers}}$ to be obtained from all experiments in which the first distance, p_1 , or any distance that includes p_1 is studied, a_{12} (or a_{21}) is the sum of such values from those experiments in which the distance $p_1 + p_2$ or any distance including both p_1 and p_2 is studied, etc.; and b_1 is the sum of the values $\frac{(\text{total individuals})^2}{\text{non-crossovers}}$

from all experiments dealing with p_1 , or a distance that includes it, etc. The author applies this method to obtain the most probable chromosome map from certain results of Lancefield and Metz, and then calculates the accuracy of fit of the observed series of results to this map. The fit is fair, though not close,—doubtless owing to genetic or environic influences causing slight variations in frequency of crossing over.—*H. J. Muller.*

3177. FRECKMANN, W. *Pflanzenzüchtung und Moorkultur*. [Plant breeding and moor-culture.] Jour. Landw. 70: 109–116. 1922.—Cultivation of moors is regarded as necessary for German agricultural self-sufficiency. Several satisfactory varieties of potatoes and beets are cultivated on moors, but their development has not been due to plant breeders. Breeders should look to their further development and find suitable strains of rye, barley, legumes, and hemp.—*Helen D. Hill.*

3178. FRIMMEL, FRANZ. *Über die Vererbung der Fruchtgrösse der Tomaten*. [Inheritance of fruit size in tomatoes.] Zeitschr. Pflanzenzücht. 8: 457–462. 1922.—Size of fruit in tomatoes is a complex character depending upon number of carpels per fruit and size of individual carpels. Varieties (29) of tomatoes having an average fruit weight of 5–200 gm. were crossed with Burbank's Preserving, a small non-fasciated variety with an average fruit weight of less than 5 gm. Average weight of the hybrids varied from 16 to 25 gm. Fasciation, which is necessary for large fruits, appears to be recessive in these crosses. Heterosis in the hybrids was marked. Average yield per acre of the hybrids was greater than for standard varieties by more than 3000 pounds per acre. The author believes that this increase justifies crossing as a commercial practice.—*P. C. Mangelsdorf.*

3179. FRUWIRTH, C. *Handbuch der landwirtschaftlichen Pflanzenzüchtung*. Bd. I. Allgemeine Züchtungslehre der landwirtschaftlichen Kulturpflanzen. [Handbook of agricultural plant breeding. Vol. I. General principles for the breeding of agricultural plants.] 6th rev. ed., xviii + 443 p., 8 pl., 91 fig. Paul Parey: Berlin, 1922.—A comprehensive, general treatment of the theoretical principles of genetics and their application to plant breeding is given. The edition differs from the 5th only in scattered changes throughout the book.—*R. E. Clausen.*

3180. GAINES, E. F., and F. J. STEVENSON. *Rye-wheat and wheat-rye hybrids*. Jour. Heredity 13: 81–90. 4 fig. 1922.—This is the 1st record of a cross between *Secale* and *Triticum* in which rye was used as the female. Rosen rye was used as the female parent in crosses with Hybrid 128, Winter Fife, and Jenkin wheats; and as the pollen parent in a cross with Turkey wheat. In all crosses the hybrid offspring resembled the species of the female parent. The F_1 plants showed a high degree of sterility but some of the F_2 plants were fully fertile. *Tilletia Tritici* was found in the F_2 of both Hybrid 128 \times Rosen and Rosen \times Turkey. The results indicate an unusual recombination of chromatin as rye has 7 chromosomes while the wheats have 21.—*E. F. Gaines.*

3181. GARMAN, H., and H. H. JEWETT. *The white flies of hot houses*. *Asterochiton abutilonea* by H. Garman and *Asterochiton vaporariorum* by H. H. Jewett. Kentucky Agric. Exp.

Sta. Res. Bull. 241. 75-111. 10 fig. 1922.—A few observations are recorded on the life history and physical characters of *A. abutilonea* followed by a comprehensive life history study of *A. vaporariorum*. Tests of various insecticides for control are recorded. Fertilized and unfertilized females of *A. vaporariorum* show no appreciable difference in the number of eggs laid. Unfertilized eggs produce all males. Fertilized eggs do not produce all females, the proportions being nearly 40 per cent males and 60 per cent females. In one case of 818 adults collected in the greenhouse in May, 549 were females and 270 males. In March of the same year, of 362 adults collected 212 were males and 150 were females.—W. D. Valleau.

3182. GATENBY, J. BRONTÉ. Sex change in Mollusca. Nature 110: 544. 1922.—The author objects to Spärek's conclusion [see Bot. Absts. 12, Entry 3267] that the male stage in the oyster is due to low temperature. He cites observations on certain hermaphrodite Mollusca which seem to show that nutriment is a determining factor, and other observations which point to factors other than temperature and nutriment.—R. E. Clausen.

3183. GATES, R. RUGGLES. A new type of variability in plants. 2nd. Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 100-101. Williams & Wilkins Co.: Baltimore, 1923.—The current interpretation of size inheritance depends upon the assumption of several cumulative Mendelian factors for size, without dominance and with free distribution of the factors in the germ cells of hybrid generations. This conception has been applied to many cases of quantitative inheritance. It is at least possible, however, that the inheritance of repeated parts such as flowers and leaves may follow a different law from that of the inheritance of size or weight of the organism as a whole. In crosses between *Oenothera* species (*O. rubricalyx* and *O. biennis*) with large and small flowers the F_1 is intermediate in petal-length, while in later generations a wider range of variation occurs than in both parent species together, different lengths of petal occurring on the same plant and even sometimes in the same flower. Curves of variability show that these differences are partly inherited but without fixed units being involved. In later inbred generations the range of variation is progressively less, until the curve of variation resembles an ordinary fluctuation curve. This type of behavior is then intermediate between (1) fluctuation and (2) Mendelian inheritance. It may depend in part on mass segregations occurring in the cytoplasm, as contrasted with the segregation of chromosomes in the germ cells.—R. Ruggles Gates.

3184. GATES, R. R. Mutations and evolution. New Phytol. 19: 26-34, 64-88, 132-151, 172-188, 213-253. 1920.—The subject is discussed mainly from the point of view of *Oenothera* mutations.—I. Introduction. The modern Mendelian-mutationist's view of evolution is at best only a slight refinement of Darwinism. "When Darwin refers to individual differences it is usually clear that he is citing what we should now call small or parvigrade (Poulton) mutations. * * * It appears probable that the era of the vain search for a single evolutionary principle is now at an end. * * * Future advance in the understanding of evolution must then consist in the determination of the limitations of each factor."—II. Foundations of the mutation concept. Most conspicuous and most clearly understood types of *Oenothera* mutants are forms having 1 extra chromosome (e.g., *O. lata*). These, as well as certain triploid mutants (e.g., *O. semi-gigas*), never breed true and can only occupy a somewhat temporary and aberrant place in evolutionary descent. Tetraploid forms, however (e.g., *O. gigas*), breed true and evidently represent a condition of considerable evolutionary significance. The author recognizes that the most frequent type of mutation in most organisms is locus change. He discusses general characteristics of locus change; nature of "mass mutations;" origin of duplicate genes. Seeming infrequency of these simple Mendelian factor mutations in *Oenothera* is probably due to masking by lethal factors.—III. Forms having an extra chromosome. As regards 15-chromosome forms of *Oenothera*, several of the types have probably arisen from *O. Lamarckiana* as the result of different chromosomes becoming the extra one. Others, closely related to *O. lata*, probably have same extra chromosome. Differences between forms of the latter group are accounted for partly by presence of other mutational characters in addition to the extra chromosome, "and partly by fresh rearrangements of the 15 chromosomes."—IV. Non-

disjunction in *Drosophila*. Bridges' work on primary and secondary non-disjunction of X-chromosomes is considered in detail and attention called to the fact that in *Drosophila* and other animals individuals containing an extra chromosome show no external peculiarity, whereas in the 15-chromosome forms of *Oenothera* external characters are always directly affected.—V. Parallel mutations. Cases are discussed in *Oenothera* and in *Drosophila* (work of Metz) in which the same or similar mutations have originated independently in different species. "The evidence from these parallel mutations with similar linkage relationships shows that even the finer elements of the germplasm have maintained their relative positions and potentialities from species to species."—VI. Presumptive mutations in wild and cultivated plants. Mutation "is so common in flowering plants that it may be considered exceptional to find a species without any mutational varieties." Many examples are briefly described.—VII. Mutations in animals. Well known mutations in wild and domesticated forms are briefly described and discussed.—VIII. Limitations of the cell theory. Modern experimentalists tend to refute or ignore views of many paleontologists, anatomists, and others who deal with non-experimental data of evolution involving orthogenesis and inheritance of acquired characters. The author maintains both factors are necessary to account for evolution, and attempts to clarify the situation by distinguishing 2 general types of characters in higher organisms: (1) cell characters, or karyogenetic characters, which arise through mutation, are represented in every cell and are usually inherited as distinct units; (2) organism-as-a-whole characters, or organismal characters, which arise through impact of the environment or through orthogenesis, may apply only to localized portions in the life-cycle of the organism (show recapitulation), and "at first are not incorporated in the germplasm."—IX. The recapitulation theory. This principle, which is universally recognized, implies that at some stage in phylogeny an increase in the life-cycle took place by the addition of certain stages. This contrasts sharply with germinal (mutational) change, "which necessarily modifies every stage, at least internally as regards nuclear structure, but can hardly be held to * * * increase the number of stages in the life-cycle." Recapitulation implies inheritance of acquired characters. Applications of the principle in plant and animal kingdoms are discussed.—X. Inheritance of acquired characters. Recent experimental evidence is discussed and the point stressed that Neo-Lamarckian and mutation factors in evolution are not incompatible.—XI. General comparison of recapitulatory and karyogenetic characters. Cases in which mutational (karyogenetic) characters are superimposed on recapitulatory (organismal) characters are discussed. The latter always involve gradual adaptation to a new habitat, while the former do not. Mutational characters are stable from the outset, but fixation of organismal characters requires a number of generations; * * * in the process, altered metabolic products in the cytoplasm ultimately produce a modification of a chromatin element which is permanent in character."—XII. Orthogenetic characters. These stand midway between karyogenetic and organismal characters. Like the former, they are germinal in origin; and like the latter, they show recapitulation; but recapitulation is not adaptational. A bibliography of 187 titles is given.—*Merle C. Coulter*.

3185. GATES, R. R. Some points on the relation of cytology and genetics. Jour. Heredity 13: 75-76. 1922.—The author refers to certain points raised by E. Eleanor Carothers in a review of Sharp's Cytology, and points out that in many plants the search for chromosome tetrads is futile since they do not regularly occur. In *Oenothera* and *Lactuca* the heterotype division separates whole chromosomes. The only exception to this is that in *Lactuca* twisting of the chromosomes round each other occurs and apparently leads later to crossing over. There is definite evidence for this in *Lactuca*, but in *Oenothera* such twisting has never been seen and must be very rare if it occurs at all. Hence there is no known basis for genetical crossing over in *Oenothera* although there is clearly such a basis in *Lactuca*.—*R. R. Gates*.

3186. GHIGI, ALEXANDRE M. L'hybridisme dans la genèse des races domestiques d'oiseaux. [Hybridism in the origin of domestic races of birds.] Genetica 4: 364-374. 1922.—Crosses were made between different species of guinea-fowl, domestic poultry, pigeons, and geese. In most cases considerable difficulty was experienced in securing an F₂ generation as most of the hybrids appeared sterile. Both physiological and morphological causes are

thought to be responsible for the sterility. The races of domestic fowl are divided into 3 general types: (1) races somewhat similar in body type and producing white eggs; (2) races of variable body type and shape and producing brown eggs; (3) races developed from crosses of the first 2 types. Many characters were studied and cited to show the composite origin of modern races of fowls.—*F. A. Hays*.

3187. GOLDSMITH, WM. M. "The Catlin mark." *Jour. Heredity* 13: 67-71. 4 fig. 1922.—An account is given of the inheritance for 5 generations of a curious defect in the parietal bones of the skull. The defect varies in size from a hole 1 inch in diameter to a mere depression in the bone without a hole. The holes are larger during childhood than in later life. The defect causes only slight inconvenience and has no apparent effect on mentality.—*R. C. Cook*.

3188. GOUGH, G. C. Bud variation in potatoes. *Gard. Chron.* 71: 334. 1922.—Cases of a white variety throwing a colored tuber and *vice versa* are discussed and references and data on the subject from German literature are given.—*P. L. Ricker*.

3189. GOWEN, JOHN W. Report of progress on animal husbandry investigations in 1920. *Maine Agric. Exp. Sta. Bull.* 299. 85-120. Fig. 37-43. 1921.—The following subjects studied at the Maine Agricultural Experiment Station in 1920 are discussed: ability of different men to judge the dairy cow for milk yield; relative value of the 7-day and 365-day milk yield as a measure of the milking capacities of the cow; mean butter-fat yield of the different breeds and their advanced registry requirements; relation of twinning to age in dairy and beef cattle; progeny performances of Holstein-Friesian sires; inheritance of milk yield and butter-fat percentage as indicated by 1st-generation crosses; Mendelian experiment on the inheritance of milk yield and butter-fat percentage; the effect of modifying milk for butter-fat content on the content of the other solids.—*Sewall Wright*.

3190. GOWEN, JOHN W., and MILDRED R. COVELL. Studies in milk secretion. IX. On the performance of the progeny of Holstein-Friesian sires. *Maine Agric. Exp. Sta. Bull.* 300. 121-252. Fig. 44-45. 1921—Among 449 Holstein-Friesian bulls with 2 or more tested daughters in the advanced registry, the author finds that only 48 had daughters whose average was significantly above that of the breed and only 29 had daughters significantly below. He finds that the sires of high producers are slightly more inbred than the sires of low producers, but less inbred than a random group of sires. He concludes that inbreeding to the extent actually practiced is at least not detrimental. A study of the pedigrees of sires of high milkers, sires of low milkers, and random sires indicate that the appearance of an animal in a 4-generation pedigree gives no appreciable indication of true worth as a sire. Similar conclusions are reached with respect to butter-fat percentage. Tables are presented showing the records of sires in considerable detail.—*Sewall Wright*.

3191. GREENE, ELIZABETH. A study of 150 adolescent runaways. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 413-415. Williams & Wilkins Co.: Baltimore, 1923.—Among the so-called delinquent girls who pass through the Mental Clinic of the New York Probation and Protective Association the largest group is that of the runaways. This group is essentially interesting from a eugenical point of view but is by no means a homogeneous one. Within it are found true wanderers, hyperkinetics, and inadequates.—The statistical facts show a group of young girls, the oldest 23, the youngest 14, who left home for various reasons. The largest number have been factory workers, but they are by no means a defective group. Over $\frac{1}{2}$ fall into the normal or dull normal classes and about $\frac{1}{4}$ are defective. While only $\frac{1}{5}$ are foreign born, a very large group are the children of immigrants, in fact a much larger group than in the general population of New York State.—Most of these girls are adolescents, restless and impatient of authority; yet it seems fairly evident that their wanderings are more dependent upon inherited traits and individual characteristics than upon any other one cause.—*Elizabeth Greene*.

3192. GRIER, N. M. **Variation in the flower of the wild carrot.** (*Daucus Carota* L.) *Torrey* 22: 64-66. 1922.—Umbels of the wild carrot often show 1 or more purple central florets. Some report these florets always present; others that they occur in 50 per cent of the specimens. Actual count of 6148 specimens shows them present in 1609. The number of purple florets per umbel varies. No genetic studies of the material have been made.—*P. C. Mangelsdorf*.

3193. HARLAND, S. C. **Inheritance of certain characters in the cowpea** (*Vigna sinensis*). *Jour. Genetics* 12: 254. 1922.—Since the publication of his former paper [see *Bot. Absts.* 3, Entry 1003] the author has obtained from Vilmorin of Paris a cowpea with another type of seed-coat pattern; this type he designates "Very Small-eye." A cross of Small-eye (*dY*) by Very Small-eye (*Dy*) gave, in F_2 , a 9 : 3 : 4 ratio as follows: 9 *DY* (Watson) : 3 *dY* (Small-eye) : 3 *Dy* (Very Small-eye) : 1 *dy* (Very Small-eye). The Small-eye may be regarded as due to a factor *Y*, dominant to its absence. The factor *D* has no effect on seed-coat pattern except in the presence of *Y*, but is also a factor for dark flower color.—*H. N. Vinall*.

3194. HARRIS, J. A., and H. R. LEWIS. **The interrelationship of the egg records of various periods during the first and second year of the White Leghorn fowl.** *Poultry Sci.* 1: 97-107. 3 fig. 1922.—Two-year records on 443 Single Comb White Leghorns in the First International Egg Laying and Breeding Contest of Vineland, New Jersey, are studied. Comparison of correlation coefficients for monthly vs. annual record and for monthly vs. production for the remaining 11 months of the year in 2nd year records in general agrees with similar studies on pullet year records. Regression of annual production of the 2nd year on monthly production of the same year is roughly linear. Second year records may be predicted from 2nd year monthly records with about the same degree of accuracy as pullet year records may be predicted in the White Leghorns.—*F. A. Hays*.

3195. HAYDEN, C. C. **A case of twinning in dairy cattle.** *Jour. Heredity* 13: 22-24. 4 fig. 1922.—A Holstein cow bore 5 sets of twins and 2 singles, the latter females. Her daughter, sister, granddam, and great-granddam each bore 1 set of twins. Of the 9 sets 3 were males and 6 were male and free-martin.—*C. C. Hayden*.

3196. HAYS, F. A. **Inbreeding animals.** *Delaware Agric. Exp. Sta. Bull.* 123. 44 p., 9 fig. 1919.—Inbreeding Guernsey disclosed no appreciable relation between milk yield, or butter-fat, and the degree of inbreeding. The amount of May Rose breeding seemed to be a more important factor. Experiments in inbreeding swine (108 litters) indicated that inbreeding reduces the certainty of pregnancy, reduces size of litter, increases the death rate at all ages, and reduces the rate of gain after birth (but not birth weight) as compared with outbred or crossbred hogs.—*Sewall Wright*.

3197. HERWERDEN, M. A. VAN. [Dutch rev. of: JOLLOS, V. *Experimentelle Protistenstudien. I. Untersuchungen über Variabilität und Vererbung bei Infusorien.* (Experimental studies on Protista. I. Investigations on the variability and heredity of infusoria.) *Arch. Protistenk.* 43: 1-222. 1921.] *Genetica* 4: 468-470. 1922.

3198. HERWERDEN, M. A. VAN. [Dutch rev. of: MULLER, H. J. *Variation due to changes in the individual gene.* *Amer. Nat.* 56: 32-50. 1921.] *Genetica* 4: 474-475. 1922.

3199. HOLLAND, T. H., and M. K. BAMBER. **Rubber** (investigation at the Peradeniya Experiment Station, Ceylon.) *Tropic. Agric.* 58: 258-263. 1922.—In a study of individual rubber tree yield at the Experiment Station, Peradeniya, trees were grown from Tree No. 2 of Henaratgoda, which has given largest recorded yield of rubber in Ceylon. Ninety trees per acre were grown. Except for air and light, environmental conditions were very similar for all trees. The trees were divided into 4 classes, yielding respectively 5-6, 4-5, 3-4, and 2-3 pounds and containing respectively 7, 42, 76, and 36 trees. Girth was apparently correlated with

yield.—In a study of 2- and 3- day tapping trials percentages of yield of the alternate-day tapping blocks, which were obtained from blocks tapped every third day, decreased in proportion to the increased speed at which the alternate-day tapping reached the base of the tree.—The effect of different fertilizer treatments upon yield of rubber trees is given.—*Walter Scott Malloch.*

3200. HOLLE, G. L. J. *Zaadselectie bij Hevea.* [Seed selection in Hevea.] Arch. Rubbercult. Nederland.-Indië. 4: 392-396. 1920.—Seed from a number of trees of known yield were planted, and all daughter trees large enough tapped at the age of 4 years. Several mother trees of modest yield produced a considerable number of daughter trees of high yield and a number of mother trees of high yield produced daughters with small yields. Cross pollination is blamed for this condition and vegetative reproduction is recommended as a surer means of securing high-yielding trees.—*C. D. LaRue.*

3201. HOLMES, S. J., and J. C. GOFF. *The selective elimination of male infants under different environmental influences.* 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 233-251. Williams & Wilkins Co.: Baltimore, 1923.—More males than females die in the 1st year of life from nearly all causes. It was found that in countries in which the infant death rate has been reduced, the ratio of male deaths to female deaths increases. This ratio is higher in countries with low infant mortality than in those with high infant mortality. It is higher for legitimate than for illegitimate infants, and in the U. S. A. it is higher for infants of native-born parents than for those of foreign-born parents. It is much higher in whites than in negroes, and it has generally been higher in cities than in the country except in cases in which the rural infant mortality is greater than the urban. All those environmental conditions that decrease infant mortality increase the relative mortality of males as compared with that of females. On the other hand in passing to periods in the development of the individual in which infant mortality is high the ratio of male to female deaths increases. This ratio is higher in the 1st month than subsequently and gradually decreases through the succeeding months of the 1st year and the early years of childhood. It is especially high for still births and higher still for early abortions. These results point to a constitutional inferiority of the male sex that is greatest in early embryos and becomes relatively less in later development and in the years after birth. Natural selection discriminates against the male on the basis of his inherited constitution. But he "is suffered to continue in existence by virtue of a peculiar mechanism of sex determination which insures his continued production." "The way in which natural selection discriminates between the stronger and weaker sex gives us a clue as to how it acts as between the stronger and weaker members of the same sex. With a severe death rate doubtless more of the congenitally weak perish, just as more boys perish than girls under the same conditions. With a mild death rate, a death rate that results from removing, so far as possible, all the external causes of mortality, it is probable that in each sex the death rate is based more strictly on inherent differences of constitution, as it is in the case of the relative mortality of the two sexes. In relation to natural selection, we may say, then, that what the male is to the female, a congenitally weak infant of either sex is to a congenitally strong one of the same sex. If this is true, as infant mortality increases it eliminates a larger number of weaklings, but it becomes less stringently selective. It takes more of the relatively strong along with the weak. With fewer deaths there is less proportionate loss of the strong, and those who perish, despite the improvements of conditions of life, represent a group with relatively low congenital vigor."—*S. J. Holmes.*

3202. HUNT, HARRISON R. *Matrimonial views of college students.* Jour. Heredity 13: 14-21. 1922.—Unsigned questionnaires were returned properly filled out by 63 women and 265 men of the University of Mississippi, from which it is concluded that in general the attitude of the students is morally and eugenically good.—*R. C. Cook.*

3203. HURST, C. C. *The genetics of fecundity in the domestic hen.* 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 212-216. Williams &

Wilkins Co.: Baltimore, 1923.—The report includes 1882 pullet year records with White Wyandottes and White Leghorns. Five pairs of factors influencing fecundity are described: (1) *E*, a dominant factor for early sexual maturity; (2) *W*, a dominant factor for fast winter production; (3) *S*, a dominant factor for fast spring production; (4) *M*, a recessive factor for fast autumn production; (5) *H*, a recessive factor for non-broodiness.—Two pairs of factors affecting egg character are described: (1) *N*, a dominant factor for small egg weight; (2) *C*, a dominant factor for brown egg color. A gross divergence of less than 2 per cent from expected ratios is reported. No sex linkage was discovered in any of the factors.—*F. A. Hays*.

3204. HUTCHISON, C. B. **The linkage of certain aleurone and endosperm factors in maize and their relation to other linkage groups.** Cornell Agric. Exp. Sta. Mem. 60. 1421-1463. 1922.—Evidence is here presented showing the order of the known genes in 1 chromosome of maize to be *I-C-Sh-Wx* with a very close linkage between *I* and *C*. Tests of different members of the *I-C-Sh-Wx* chromosome group with 5 other recognized groups indicate that this group is independent of the others though with 2 of these there still remains a possibility that it lies in the end region of one or the other. Nine characters not identified with any group as yet were tested with the several members of the *I-C-Sh-Wx* group and found independent of it.—*J. H. Kempton*.

3205. IKENO, S. **Vererbungsversuche über die Blütenfarbe bei *Portulaca grandiflora*.** [Investigations on flower color in *Portulaca grandiflora*.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 122-135. 1922.—This is a résumé of a paper appearing in Jour. Coll. Agric. Imp. Univ. Tokyo 8: Part 1. 1921.—In it are described crosses between plants having orange, yellow red, purple, and white flowers. Orange by white gives orange hybrids, which on selfing give 3 orange to 1 white. Orange by red gives red hybrids, which, when selfed, give 3 reds to 1 orange. Purple by red gives purple, and selfed gives 3 purple to 1 red. Purple by white gives purple hybrids segregating in the ratio of 9 purple: 3 orange: 4 white. Since this is a dihybrid ratio and reds are missing the author concludes that the factor modifying red to form purple is in the same chromosome as the one which modifies orange to form red. Subsequent cultures confirm this hypothesis and show a cross-over ratio of about 15 per cent. The author designates the described factors as follows; *CCrb rb gg* = orange; *CCGG rb rb* = yellow; *CCggRb Rb* = red; *CC gg RB RB* = purple. Four white genotypes are mentioned for 2 of which the following tested formulae are given: white I = *cc rb rb*; white II = *cc RB RB*. White I × orange gives orange which segregates into 3 orange: 1 white. White II × orange gives purple which segregates into 9 purple: 3 orange: 4 white. White III by orange gives orange which segregates into 9 orange; 3 pseudo-white: 4 white. White III and pseudo-white are still under investigation.—*Flora M. Scott*.

3206. JONES, D. F. **Selective fertilization and the rate of pollentube growth.** Biol. Bull. 43: 167-174. 2 fig. 1922.—The author has previously shown [see Bot. Absts. 6, Entry 1700] that in maize the plant's own pollen is somewhat more efficient in completing fertilization than pollen from plants of a somewhat different genotype, the superiority of self-fertilization being greater as germinal differences increase. He now demonstrates that this selective action is due in part, at least, to differences in rate of pollen-tube growth. All the silks of the ear were trimmed off to an even brush, and a mixture of own and foreign pollen applied, using reciprocal crosses as controls. Thus pollen-tubes would have to traverse a considerably greater distance to reach the lower ovules of the ear than the upper. This resulted in relatively fewer cross-fertilized seed near the base of the ear than near the tip, indicating that own pollen-tubes grow faster than foreign pollen-tubes. The author discusses additional evidence provided by the work of Miller, Balls, Heribert-Nilsson, and Correns. "The discrimination which works against the bringing together of individuals of unlike germplasm has been demonstrated by representatives of four distinct orders in the two main classes of angiosperms."—*Merle C. Coulter*.

3207. JONES, L. R., and J. C. WALKER. **Yellows—resistant cabbage varieties. Some necessary precautions for seedsmen to consider in the production and distribution of seeds of new special strains.** Seed World 13: 20–21. 1 fig. 1923.—This serious disease occurs in the central states from Kansas to New Jersey and as far north as central Wisconsin, southern Minnesota, and southern New York. Resistant plants are secured through mass selection from "sick" soil. A high degree of resistance may thus be acquired but it is never absolute; hence continued selection is necessary. Seedsmen are advised to secure stock seed from resistant "mother heads" and to confirm this resistance by trial on "sick" soil before placing such seed in a cabbage seed-growing locality, under proper isolation for 1 generation's increase. The increase crop of seed should be held over for 1 year and its resistant quality proved.—*J. A. Faris.*

3208. KAPPERT, H. [German rev. of: MOL, W. E. DE. **Over het voorkomen van heteroploide variëteiten van *Hyacinthus orientalis* L. in de Hollandsche kulturen.** (The occurrence of heteroploid varieties of *Hyacinthus orientalis* in Dutch cultures.) *Genetica* 3: 97–192. 1921 (see Bot. Absts. 10, Entry 1072).] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 138–139. 1922.

3209. KEITH, A. **Our nearest living relatives.** [Rev. of: GREGORY, WM. K. *The origin and evolution of the human dentition.* xviii + 548 p., 15 pl. Williams and Wilkins Co.: Baltimore, 1922.] *Nature* 110: 834–836. 1922.

3210. KEMPTON, J. H. **Linkage between brachysm and adherence in maize.** *Amer. Nat.* 56: 461–464. 1922.—The loci of the recessive genes for brachytic (short internodes), and for adherent grains, gave, in a progeny of nearly 400 plants from selfed ears, 22 per cent of crossing over. Over 500 plants resulting from a back cross gave, however, 30 per cent. In a 2nd experiment, with a larger number of plants from selfed ears, the crossing over was about 17 per cent.—*John Belling.*

3211. KIRCHNER, O. VON. **Über Selbstbestäubung bei den Orchideen.** [Self-pollination in orchids.] *Flora* 115: 103–129. 1922.—The extent and success of self-pollination is generally underestimated in accounts of orchids. The investigations of the author bring the list of species in which it may occur to 15 for European and 106 for foreign orchids. There are 10 types of orchid flower which permit or necessitate self-pollination. In the majority of cases it results in fertile seed.—*A. G. Stokey.*

3212. KLAPHAAK, PETER J., and H. H. BARTLETT. **A preliminary notice of genetical studies of resistance to mildew in *Oenothera*.** *Amer. Jour. Bot.* 9: 446–458. 1922.—In all 5 strains of *Oenothera* used the eggs differed from the sperms, the former being α gametes, the latter β gametes, except in a few rare cases when metacenic plants are produced. The factor for immunity (*I*) to *Erysiphe Polygoni* DC. is dominant; entering the zygote from either side, the plant produced is immune. The factor for susceptibility is designated by *i*. The genetic constitutions of the 5 strains, with regard to the factors for immunity and susceptibility, and their reactions to the mildew, are as follows: *O. pratincola* hyb. *immunis*, $\alpha i \beta I$, immune; *O. cinerescens*, $\alpha I \beta i$, immune; \times *O. mississippiensis* (called "Cartersville" by deVries), $\alpha i \beta i$, susceptible; "*O. biennis* Chicago" (a strain of *O. pratincola* used by deVries), $\alpha i \beta i$, susceptible; *O. pratincola* ("Lexington C") $\alpha i \beta i$, susceptible. These strains were self pollinated and all possible crosses between them were made. In every case the reaction of the hybrid to the mildew conformed exactly to expectation according to the formulation above, as: *O. pratincola* hyb. *immunis* \times *O. cinerescens*, $\alpha i \beta i$, susceptible. Of the total of 20 hybrids, 13 were susceptible, 3 had a single factor for immunity derived from the maternal parent, 3 had a single factor for immunity derived from the paternal parent, and 1 only had double immunity derived from both parents. Because of the peculiar type of heterogametism, immunity due to a single factor must breed as true as that due to a factor pair. The F_2 generation, by self pollination of the F_1 plants, was like that of the F_1 generation, as would be expected.—*Frieda Cobb Blanchard.*

3213. KIRCHNER, O. VON. Zur Selbstäubung der Orchidaceen. [Self-pollination in orchids.] Ber. Deutsch. Bot. Ges. 40: 317-321. 1922.—A study of living *Listera cordata* R. Br. discloses no self-pollination. The author's assumption concerning autogamy of *Liparis Loeselii* is confirmed. He also confirms H. Müller's notes on self-pollination in *Epipactis microphylla* Sw. Powdery character of pollen makes self-pollination possible. Nectar content and time of beginning of selfpollination distinguished the author's specimens from those described by H. Müller. The author's former notes on self-pollination in *Epipactis latifolia* All. var. *viridiflora* Irm. were opposed to H. Müller's description indicating no self-pollination. A recent description by Zimmermann indicates the possibility of regional differences perhaps of generic value.—Helen D. Hill.

3214. KOEHLER, OTTO. [German rev. of: COLLIER, W. A. Einführung in die Variationsstatistik, mit besonderer Berücksichtigung der Biologie. (Introduction to the statistical study of variation with special regard to biology.) 72 p., 8 fig. Julius Springer: Berlin, 1921.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 199-200. 1922.—Koehler considers that Collier's book does not go far enough for geneticists accustomed to the use of biometric methods and deals too summarily with its subject for those who need an introduction to such methods. Its principal usefulness, he considers, is in its collection of formulae.—Sewall Wright.

3215. LAUGHLIN, H. H. Nativity of institutional inmates. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 402-406. Williams & Wilkins Co.: Baltimore, 1923.—This study is the result of a special institutional survey made of the state and federal custodial institutions for all types of the socially inadequate. There was allotted, for each nativity group, a quota based upon its total numbers in the population of the U. S. A. In summarizing the matter for all types of institutions, the following quota-fulfillments in custodial institutions are found: (1) native born, both parents native born, 89.08 per cent; (2) native born, 1 parent native born, 1 parent foreign born, 120.60 per cent; (3) Native born, both parents foreign born, 104.28 per cent; (4) Foreign born, both parents foreign born, 134.42 per cent. This seems to indicate that on the whole the recent immigration is not so sound as the older, and that in order to select immigrants of greatest value, it will be necessary to select on the basis of family stocks as well as individual merit.—Harry H. Laughlin.

3216. LAUGHLIN, H. H. Present status of eugenical sterilization in the United States. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 286-291. Williams & Wilkins Co.: Baltimore, 1923.—Fifteen states have enacted laws in reference to eugenical sterilization. The main theme of these statutes is eugenical rather than punitive. The individual laws vary greatly in the details and extent of applicability. The result is that several of the statutes were declared unconstitutional because running counter to certain provisions of the Bill of Rights. Others, more carefully drawn, were sustained by the courts, particularly when punishment was not involved. Prior to Jan. 1, 1921, thousands of persons had been legally sterilized under the laws in the several states, notably in California. Eugenical sterilization is shown to be legally possible, and its application awaits only the demand for and the enactment of suitable legislation. A descriptive and statistical chart is appended.—Harry H. Laughlin.

3217. LAUGHLIN, H. H. The science and the practical application of eugenics. Jour. Heredity 13: 93-96. 1 fig. 1922.—This paper sets forth the 2 phases of eugenics,—the science and the practical application. An outline is given of the present and, if current tendencies continue, of future coordination between the underlying principles of eugenics and its practical application by families and nations. A short history of Galton's coinage of the word 'eugenics' is included. There is given also an explanation of the diagrammatic scheme, showing the relation of eugenics to other sciences. This appears as an explanation of the text figure, which originally was printed on each certificate awarded to exhibitors by the Second International Congress of Eugenics. The paper concludes with an exposition of the likenesses and differences between plant and animal breeding on the one hand and eugenics on the other. It shows that

in both systems the underlying biological principles are the same, but that whereas in breeding plants and animals, mankind does not consider the elements of love, courtship, and fidelity; in eugenics, mate selection and elimination of defectives must observe the most considerate regard for morality and the highest social order. Research and education are the 2 keys to the science and practice of eugenics.—*H. H. Laughlin.*

3218. LÉCAILLON, A. Sur les caractères d'un hybride mâle provenant de l'union d'un Canard Pilet mâle (*Dafla acuta* L.) et d'un Canard sauvage femelle (*Anas boschas* L.). [Concerning the characters of a hybrid male resulting from the mating of a male pintail duck with a female wild duck.] *Compt. Rend. Acad. Sci. Paris* 174: 885-887. 1922.—The females of the 2 species are very similar, but the males are easily distinguished. The species can be crossed without difficulty. The male hybrid obtained in 1920 showed some male pintail, some wild male, and some intermediate characters, analogous to the results in a male hybrid of duck called "musqué" and Egyptian goose. The characters used were color, color pattern, and tail form.—*Helen D. Hill.*

3219. LEGRAND, LOUIS. A simple explanation of the hereditary mechanism. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 129-137, 3 diagr. Williams and Wilkins Co.: Baltimore, 1923.—An attempt is made to explain the constitution of the hereditary mechanism and its operation in development. A distinction is made between fixed characters, which are exhibited by all members of a species or larger group, and unfixed ones, which vary among individuals and from generation to generation. Fixed characters have their basis in the cytoplasm, unfixed in the nuclei. The unfixed plasmas (nuclei) are further subdivided into racial, ancestral, and individual portions, and their degree of fixity is supposed to depend upon the extent of the zone of contact with the cytoplasm. Latency and recessiveness are due to exclusion of elements from this zone, and sex depends upon the relative area of contact of female and male nuclear contributions. This organization of the cell is preserved throughout development, and the interactions "between both sorts of plasmas, their contacts, their mode of attraction and fixation, are therefore what constitutes life."—*R. E. Clausen.*

3220. LESAGE, PIERRE. Sur la persistance des caractères provoqués par la salure. [On the persistence of characters induced by saltiness.] *Compt. Rend. Acad. Sci. Paris* 176: 257-260. 1923.—Pot cultures of *Lepidium sativum* were grown continuously from 1911 to 1922, one series being watered continuously with normal water and the other with seawater. These were compared for height of plant, number and weight of seeds produced, shape of seed as obtained by dividing the length by the breadth, etc. The sea water cultures proved much less vigorous. A comparison, under uniform conditions from 1916 to 1921, was made of the check series and cultures obtained from sowing seed saved from the plants watered with salt water and also from seed saved from cultures 1 generation removed from the salt water treatment. There was a slight apparent persistence in the characters which appeared as a result of the salt water treatment.—*H. K. Hayes.*

3221. LEWIS, FREDERICK T. A note on symmetry as a factor in the evolution of plants and animals. *Amer. Nat.* 57: 5-41. 13 fig. 1923.—The author attempts to show that there is a special tendency to produce symmetrical forms in nature, and that departures from symmetry are perhaps transient phases destined to be replaced by some other type of symmetry. He discusses at length flora structure and deviations in *Campanula*, and concludes that the tricarpetate *Campanulas* are peculiarly variable on account of an imperfectly symmetrical arrangement and that the principal types centering around it represent attainments of more symmetrical and sometimes more stable forms, such as are seen in *Campanula medium*, *Platycodon*, *Canarina*, *Michauxia*, *Phyteuma*, and *Jasione*. He then discusses symmetry in the aortic arches, particularly on the basis of studies of sheep embryos made in collaboration with G. H. Jackson, Jr., which show that an early symmetrical arrangement is soon lost as development proceeds, and ultimately passes into a very different arrangement which is nearly sym-

metrical. Normal and variant conditions in other mammals are described, and the relation of veins to corresponding arteries is considered briefly. Probable trends of evolution on the basis of attainment of more symmetrical arrangements are pointed out. In the disposition of the principal viscera he shows that the adult condition is reached by a dextral rotation from an early bilateral condition. The general conclusion is reached that nature is ill at ease in the presence of asymmetry; and that when one condition of symmetry is lost, another may arise from it. In a postscript he contrasts his ideas with those of Conklin.—*R. E. Clausen.*

3222. LILLIE, FRANK R. **Supplementary notes on twins in cattle.** *Biol. Bull.* 44: 47-78. 13 fig. 1923.—Various points regarding the free-martin left somewhat indefinite in a former paper are here discussed in the light of additional data. (1) Two additional cases of 2-sexed twins where female is normal are described. In these there is no vascular anastomosis between chorions. (2) The sex-ratios of twins, counting free-martins as females, turns out to be essentially that of species, i.e., about 120 males to 100 females. (3) One case of possible monozygotic twinning was found. Only 1 corpus luteum was present, but there may have been 2 ova in 1 follicle. (4) The degree of modification of a free-martin is not in proportion to size of vascular connection, some of the smallest connections giving the largest modification, and vice versa; it is a case of an "all-or-none" reaction. (5) In a previous paper, seminal vesicles in foetal free-martins were overlooked [see *Bot. Absts.* 1, Entry 1260]. More careful dissection shows them to be almost always present. (6) The earliest stage of the free-martin which was found is 3.75 cm. long. It is already extensively modified and must have begun to change not later than at the 3.0 cm. stage. The earliest appearance of sex differentiation of testis is at 2.5 cm. stage. The onset of change in free-martin coincides closely with differentiation of testis of male twin. (7) A general discussion considers Minoura's experiments on fowls, Keller and Tandler's work on cattle and goat twins, Hartman's "reciprocal free-martins," and Doncaster's interpretation of tortoise-shell tomcat.—*H. H. Newman.*

3223. LITTLE, C. C. **The inheritance of a predisposition to cancer in man.** 2nd. Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 186-190. Williams & Wilkins Co.: Baltimore, 1923.—Tabulation of family histories on file at the Eugenics Record Office of the Carnegie Institution of Washington show that there is clear evidence for the inheritance of a predisposition to formation of "cancer" in man. For this analysis all types of malignant tumors are lumped together under the term "cancer." The influence of inheritance is shown by the occurrence of a marked excess of "cancerous" individuals, over rate of general population, in (1) sibs of "cancerous" individuals, (2) progeny of "cancerous" mothers by non-cancerous fathers, (3) progeny of non-cancerous mothers by "cancerous" fathers. The fact of inheritance is clear, but the type of inheritance needs further investigation. It does not appear to be simple Mendelian inheritance. This does not, however, preclude possibility that it will be found to be dependent upon multiple Mendelizing factors.—*C. C. Little.*

3224. LOTSY, J. P. **Interspecific sterility.** *Nature* 110: 843. 1922. Comment on Bateson's letter. [*Nature* 110: 76: 1922.]

3225. LUSH, JAY L. **Hereditary notch in the ears of Jersey cattle.** *Jour. Heredity* 13: 8-13. 9 pl. 1922.—A sire is reported with a peculiar notch in the under side of the ear, which looks like a "cropped ear," used by stockmen as a mark. Many of his calves are born with similarly notched ears; it is not known whether his sire or dam had this mark. The manner of inheritance indicates that it is a single dominant factor, independent of sex. The notches in the ears of the calves are of all sizes, from that of the sire's to a slight flattening of the lower side. The importance to genetics of studying non-economic characters is commented on.—*R. C. Cook.*

3226. McCLUNG, C. E. **Evolution of the chromosome complex.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 65-75. Williams & Wilkins Co.: Baltimore, 1923.—The author indicates that the chromosome theory of heredity now serves the biologist much as the atomic theory does the chemist. All facts bearing upon chromosomes are,

therefore, of great importance. He points out, accordingly, the significant facts derived from extensive studies by his students and himself upon most of the North American species of the orthopteran family Acrididae. The great precision and definiteness of chromosome organization in this group is indicated by the fact that a common number is almost universal. Apparent variations are explainable and serve only to strengthen the conception of constancy. From this it follows that the members of a complex in any species are individually homologous with those of any other, and that all have been derived by direct descent from earlier members of this ancient family.—Generic and specific differences of form, size, structure, and behavior are noted and confirm the theory of chromosome individuality. The significance of these facts in ontogenetic, phylogenetic, and taxonomic studies is indicated. An ultimate analysis of factorial differences upon a physiological basis is suggested.—*C. E. McClung.*

3227. MALLOCH, WALTER SCOTT. **Value of the hemp plant for investigating sex inheritance.** Jour. Heredity 13: 277-283. 1922.—Its relatively low chromosome number (10 haploid), ease of hybridization, large number of seed produced, adaptation to field and greenhouse conditions, and possibility of a large number of variations, suggest hemp as a plant particularly adapted for an investigation of sex inheritance. A simple leafed form and a sectorial chimera are described. Criticism is offered of Schaffner's explanation of sexuality in hemp.—*Walter Scott Malloch.*

3228. METZ, C. W. **Chromosome studies on the Diptera. IV. Incomplete synapsis of chromosomes in *Dasyllis grossa* Fabr.** Biol. Bull. 43: 253-266. 2 pl. 1922.—Cytological study of *Dasyllis* indicates that in the male, and perhaps in the female, 3 of the 5 pairs of chromosomes undergo synapsis only at their ends, the median portions not fusing at all during the growth stages. Possible bearing on cases of inherited decrease or absence of crossing over is discussed.—*A. H. Sturtevant.*

3229. MOORE, C. R. **On the physiological properties of the gonads as controllers of somatic and psychical characteristics: V. The effects of gonadectomy in the guinea pig, on growth, bone lengths, and weight of organs of internal secretion.** Biol. Bull. 43: 285-312. 1 fig. 1922. The author studied growth curves of normal males and females, castrated males, and spayed females. The animals were killed when 360 days old; thyroids, hypophysis, adrenals, and spleen were weighed, and femora, tibiae, and fibulae measured. For all characters studied there was sufficient variability within each series to show that small numbers of individuals cannot give reliable results. There was apparently a slight effect of gonadectomy on most of the characters studied; the only striking results were that gonadectomy causes a distinct decrease in weight of adrenals in both sexes, and a clear increase in bone length in females.—*A. H. Sturtevant.*

3230. MORGAN, T. H. **The bearing of Mendelism on the origin of species.** Sci. Monthly 16: 237-247. Illus. 1923.—In this general discussion of the evidence which genetics offers on the origin of species, the author points out that the species concept may in certain cases be incapable of genetic interpretation, and that different systems of classification may be desirable for taxonomists and evolutionists. He argues that the evidence of Mendelian inheritance in domesticated animals and plants, and the fact that mutant characters arising under observation obey Mendelian laws, indicate that mutants have furnished the basis for artificial selection. He states that mutants may give rise to minute differences as well as large ones and that the former, now accurately distinguishable by pedigree culture methods from non-heritable fluctuations, may provide the material for organic evolution. He calls attention to the multiple effects of changes in single genes and argues that the more deep seated physiological effects may be the basis of selection. The relatively trivial superficial characters associated with these changes are seized upon as species criteria by taxonomists. He rejects the view that mutations represent losses of germinal material, and that dominance relations are of vital significance in the interpretation of the evolutionary value of mutations. He shows that crossability and the sterility of interspecific hybrids may depend upon a variety of circum-

stances, that sterility of F_1 hybrids cannot be expected to arise in the manner stipulated by Bateson, "the production of an indubitably sterile hybrid from completely fertile parents, which have arisen under critical observation from a common origin," but that attention should be focused upon the origin of differences which tend to interfere with normal conjugation of chromosomes. He describes the evidence from parallel mutation in different species, and argues that it indicates that mutation is not wholly a random process.—*R. E. Clausen.*

3231. MULLER, H. J. **Mutation.** 2nd Internat. Congress Eugenics Vol. I. Eugenics, genetics and the family. 106-112. Williams & Wilkins Co.: Baltimore, 1923.—Since the theory was proposed by Muller (1917), and is being proved by Shull (1921), that so-called "mutations" in *Oenothera*, when not chromosome aberrations, are really cases of crossing over of genes linked with the balanced lethals there, it becomes necessary to rebuild the whole theory of mutation, discarding the ideas based on *Oenothera* work and founding the theory instead upon those cases in *Drosophila* and elsewhere which can be proved to consist of changes in the genes themselves. The newer data already give evidence of at least 14 proximate principles, which, taken collectively, may be considered to constitute the new theory of mutation: (1) most genes have an extremely high stability, probably greater than that of radium atoms; (2) certain genes, however, are vastly more mutable than others; (3) external agents cannot ordinarily increase mutability enough to cause obvious "production" of mutations; (4) losses of genes occur, but not all mutations are losses; (5) a given gene can mutate in different directions, and its different mutations may even affect different characters, but (6) its mutations occur preferentially, being oftener in certain directions and magnitudes; (7) its stability and preferential direction may become altered through mutation; (8) mutation usually occurs in only 1 kind of gene at a time, and (9) in only 1 allelomorph; (10) mutation may occur at almost any time during the life-history; (11) the mutant genes tend to be recessive; (12) most mutations are deleterious in their effects; (13) visible variations caused by mutation are oftener small than large, and the smaller changes usually have greater survival value; (14) most mutations produce changes either too small to be visible or too large to be viable.—It is especially important now to obtain data upon the rate and kinds of mutations, as affected by various internal and external conditions. Such data, obtained by Muller and Altenburg (1919, 1920) for *Drosophila* under normal conditions, already give results of interest for evolutionists and eugenists—indicating necessity of periodic inbreeding, accompanied by selection, to prevent permanent stoppage of evolution through accumulation of lethal factors.—*H. J. Muller.*

3232. MYERSON, A. **Inheritance of mental diseases.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 218-225. Williams & Wilkins Co.: Baltimore, 1923.—There is no such entity as insanity, and the various mental diseases have different biological relationships. Thus the important disease, general paresis, has the relationship of syphilis; the organic diseases of the brain, especially the important group due to arterial disease, have the relationship of arterio-sclerosis. There is much evidence to show that these diseases are as common in normal families as in the abnormal. The situation in regard to feeble-mindedness and epilepsy is exactly the same, i.e., there is no entity feeble-mindedness and no entity epilepsy. Each type of feeble-mindedness and each type of epilepsy has to be considered in its familial relationships by itself.—Certain types of mental diseases show interesting and important familial relationships. The paranoid diseases, dementia praecox and manic depressive insanity, occur frequently in members of the same family group. Cases are cited to show the transition in type of mental disease which occurs from generation to generation, and also to show the types of mental diseases that occur amongst brothers and sisters. Statistics are cited to show that certain types of mental disease such as dementia praecox tend more or less to eliminate themselves because of the great reduction in the marriage rate of the individuals suffering from these diseases. The author believes that in the mental diseases which run in families, heredity of the type involved in the color of hair and eyes is not present, a germplasm injury or deviation is operating, and the matter is one for clinical medicine rather than for statistician or the biologist.—*A. Myerson.*

3233. NACCARATI, SANTE. The morphologic characteristics of psychoneuroses. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 330-340. Williams & Wilkins Co.: Baltimore, 1923.—The author, following the methods of Viola in the differentiation of the morphologic types, has found that psychoneurotics are encountered more frequently among the 2 opposite types, viz., microsplanchnic and macrosplanchnic. Normosplanchnic individuals are less likely to become psychoneurotics if put under unfavorable environmental conditions. His study made on 100 Italian psychoneurotics has also shown that microsplanchnic subjects tend to develop the asthenic forms of psychoneurosis, whereas macrosplanchnics tend to develop the emotional types of psychoneurosis. From the eugenic point of view the author warns against marriage between individuals possessing the same morphological defects, as the offspring is likely to be neurotic. From the social and hygienic standpoint he warns individuals presenting macrosplanchny and microsplanchny in excess to avoid occupations and happenings requiring unusual mental and physical strain. This precaution might have reduced the number of so-called "functionally disabled" during the war.—*Sante Naccarati*.

3234. NACHTSHEIM, H. [German rev. of: (1) RIMSKY-KORSAKOW, M. *Beobachtungen über Variabilität und Vererbung bei den Schlupfwespen*. (Observations on variation and heredity in ichneumon flies.) Arb. Naturf. Ges. Petersburg 51: 89-111. 1920. (2) WHITING, P. W. (a) Rearing meal moths and parasitic wasps for experimental purposes. Jour. Heredity 12: 255-261. 1921. (b) Heredity in wasps. A study of heredity in a parthenogenetic insect, the parasitic wasp, *Hadrobracon*. Jour. Heredity 12: 262-266. 1921. (c) Sex-determination and biology of a parasitic wasp, *Hadrobracon brevicornis* (Wesmael). Biol. Bull. 34: 250-256. 1918. (See Bot. Absts. 1, Entry 53). (d) Studies on the parasitic wasp, *Hadrobracon brevicornis* (Wesmael). I. Genetics of an orange-eyed mutation and the production of mosaic males from fertilized eggs. Biol. Bull. 41: 42-54. 1921. (See Bot. Absts. 11, Entry 365). (e) Studies on the parasitic wasp, *Hadrobracon brevicornis* (Wesmael). II. A lethal factor linked with orange. Biol. Bull. 41: 153-155. 1921.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 89-92. 1922.—Wing-length in *Prestwichia aquatica*,—an ichneumon the larvae of which parasitize eggs of the water beetle, *Dytiscus*,—is a sex limited character, being short in all males, but in females either long ("macropterous"), or short ("brachypterous"). The males arise from unfertilized eggs. It was found by Rinsky-Korsakow that macropterous P_1 females, crossed by males from brachypterous stock, yielded macropterous daughters. These F_1 females, back crossed to males from the recessive brachypterous stock, yielded macropterous and brachypterous female segregants; backcrossed to males from the dominant macropterous stock their daughters were all macropterous. The reciprocal P_1 cross yielded macropterous F_1 females, as expected, in 1 of the 5 attempted crosses, but in the 4 others brachypterous daughters appeared, which bred true to type. The exceptions are perhaps not surprising in view of the admitted difficulty of obtaining virgin females (copulation occurred within the *Dytiscus* egg and isolation of pupae was usually necessary). *Prestwichia solitaria* lays its eggs in Odonata eggs, is brachypterous, and, unlike *aquatica*, has no dark tip on the abdomen. Only 1 of 11 crosses with *P. aquatica* attempted by Rinsky-Korsakow succeeded. In this, a cross of *P. solitaria* ♀ by *P. aquatica* ♂, F_1 females were produced that possessed the instinct of laying in *Dytiscus* eggs, that had moderately long (variable) wings, and dark tipped abdomen. (The haploid brothers produced at the same time were of course light tipped, and, like all *Prestwichia* males, brachypterous.) The F_1 females, backcrossed to the recessive *P. aquatica*, yielded female segregants of the 2 opposite types with regard to laying habits, and also with regard to abdomen coloration, and having variable wing length. The F_1 females backcrossed to *P. solitaria* gave females showing only the characters of *P. solitaria*. The males from both backcrosses were of both dark and light tipped types.—The author reviews Whiting's experiments with the wasp *Hadrobracon brevicornis*, parasitic on the mealworm. The reviewer points out that this form is much more favorable for genetic work than *Prestwichia*, and says that he can fully corroborate Whiting's account of breeding methods, on the basis of his own experiments now under way. He describes breeding methods, influence of environment, sex-linkoid inheritance of orange eye (due to males arising from unfertilized eggs) and of the linked lethal factor, and mosaic males apparently arising from nonfusion of parental pronuclei.

He anticipates that further significant facts will soon be forthcoming in explanation of these "most unique hereditary relationships" existing in this "ideal object."—*H. J. Muller.*

3235. NICHOLSON, C. **Crimson cowslips.** *Gard. Chron.* 69: 301. 1921.—No reference is made in the text to crimson cowslips, but a discussion occurs of characters of hybrids, natural and artificial, between the cowslip, oxlip (*Primula elatior*), and wild *Primula*. Particular reference is made to caulescent forms.—*L. L. Burlingame.*

3236. NOYES, HILDA H., and GEORGE W. NOYES. **The Oneida Community experiment in stirpiculture.** 2nd Internat. Congress Eugenics Vol. I. Eugenics, genetics and the family. 374–386. Williams & Wilkins Co.: Baltimore, 1923.—Noyes first published his views regarding human "stirpiculture" in February, 1849. For 27 years after its foundation the Oneida Community could not undertake an experiment in scientific propagation, but in 1868 it found itself in a situation favorable for such an experiment. About 100 men and women took part, of whom 81 became parents. Fifty-eight living children were born. The Oneida Community was a product of successive selections, some of the resulting characteristics of the group being hardiness, longevity, native ability, faculty of agreement. The standard of character aimed at was one in which (1) the spiritual, (2) the intellectual, (3) the moral, and (4) the physical departments of human nature were developed to the fullest extent compatible with the above stated order of precedence. The experiment was directed by a Committee of "central members," Noyes himself exercising the preponderating influence. In a majority of cases application was made to the Committee by couples desiring to become parents, and the degree of selection exercised was considerable. The death-rate among the 81 selected parents was 22.5 per cent less than that of the group as a whole. The children received exceptional care, and at the reorganization of the Community as a joint-stock company on January 1, 1881, the women and children were amply provided for.—Some of the outstanding results of the experiment are (1) no mothers were lost during the experiment from causes directly or indirectly due to childbirth; (2) no deaf and dumb, blind, crippled, or idiotic children were born; (3) of the 58 stirpicultural children, born 1869–1879, 52 were living on September 26, 1921.—*H. H. Noyes and G. W. Noyes.*

3237. OCCHIALINII, ODDO. **Deux nouvelles variétés de Gardénia.** [Two new varieties of *Gardenia*.] *Rev. Hort.* 95: 274–276. 1923.—Two new varieties of *Gardenia* produced by Guido Mariotti, of Nervi (Italy), by artificial fertilization are minutely described. The noteworthy characteristics of each variety are emphasized and their flowers are illustrated.—*Richard Wellington.*

3238. OVEREEM, CASPAR VAN. **Über Formen mit abweichender Chromosomenzahl bei *Oenothera*.** [On *Oenotheras* with varying chromosome numbers.] *Beih. Bot. Centralbl.* Abt. I. 39: 1–80. 15 pl. 1922.—Reduction divisions in *Oenothera Lamarckiana semigigas* give fertile gametes only when 7 or 14 chromosomes are present. Variation in the normal chromosome numbers always gives variation in habit and structure and a definite form always carries the same chromosome number. Pollen of forms with 15 chromosomes is identical with that of the mother species since gametes with 8 chromosomes break down. Forms with varying chromosome numbers are the products of definite chromosome combinations. Variation in somatic counts was not found and fragmentation of chromosomes, if present, are believed to be artifacts. Although the chromosomes of *Oenothera* differ only slightly in form and size it is possible to detect differences. *O. Lamarckiana lata* shows unmistakable *gigas* characters in contrast to other forms with 15 chromosomes. *O. Lamarckiana gigas* is cytologically and anatomically a double *Lamarckiana*; it is not constant when selfed and its variation rests on a cytological basis. Hybrids of *gigas* are not uniform and as triploid forms are not constant. The appearance of 2 forms, *O. bienniformis* and *O. de Vriesii*, with typical *biennis* characters from a race of *Lamarckiana* gives a new argument for the theory of Davis that *O. Lamarckiana* of de Vries is a hybrid with some *biennis* form in its ancestry. Both of these forms are constant, although

complicated hybrids, and breed true because sterility, both zygotic and gametic, eliminates the possibility of variants from the types. A very full *Oenothera* bibliography is included.—*B. M. Davis.*

3239. [PALMER, E. F., Director.] [Plant breeding in] Rept. Hort. Exp. Sta. Vineland Sta. Ontario 1919: 8-22. 1921.—In the peach breeding work [PALMER, E. F., and F. S. REEVES p. 8-13] all of the earlier seedlings were rigidly culled and only the very best and most promising ones, constituting about 1 per cent of the total number, were retained for further study and possibly for distribution. Yellow flesh \times white flesh gives white flesh. Yellow flesh color is recessive. St. John, Fitzgerald, Elberta, Millionaire produce seedlings very true to type except in season of ripening and adhesion of flesh to stone. In this breeding work a large tent covering the entire tree was used. It was observed that cheese cloth gave better results than cotton fabric because it let in more light and air and yet was sufficiently dense to give a desirable shade or protection from the hot sun.—From the strawberry breeding work which involved several thousand individuals, 27 constitute the final selection and these will be further tested.—The raspberry and blackberry breeding work for 1919 consisted of selfing and crossing species and varieties and the taking of notes regarding the questions of self-fertility and self-sterility.—The cucumber breeding work is a continuation of previous efforts to secure a green house strain that will set a large number of fruits without the aid of artificial pollination. Three varieties, viz., Suttons Everyday, Princess and Davis Perfect were used in the parentage. A strain that seems very promising has been isolated and if by further testing this strain proves sufficiently profitable and stable it will be given to the public for a wider trial.—The sweet corn breeding has only recently been started. The experiment involves five garden varieties, viz., Golden Bantam, Charlevoit, Cooke, Stowells Evergreen and Black Mexican.—*L. R. Detjen.*

3240. PARHON, C. J., and C. [PARHON]. A pseudohermaphroditic cock. *Endocrinology* 6: 383-386. 1922.—A bird described as a hen that laid eggs and crowed but never brooded was autopsied. The plumage was female and the comb and wattles were male-type. An oval body somewhat lobulated was found on the right side at level of the genital glands. Its structure was testicular and active spermatogenesis was discovered. A tri-lobed body occupied the left side. This body resembled a testis in microscopic sections. Structures resembling the oviduct of a hen were found on both right and left sides. No ova were discovered. The adrenals were normal. The thymus was well developed. The thyroids were the size of a lentil. Broodiness is thought by these writers to depend on endocrine modifications.—*F. A. Hays.*

3241. PAYNE, F., and MARTHA DENNY. A gynandromorph in *Drosophila melanogaster*. *Amer. Nat.* 56: 383-384. 1922.—In the F_2 of a cross of a yellow white female by a garnet male appeared a mosaic individual with 1 garnet and 1 white eye. It was male throughout and fertile, and genetic tests proved that all its germ cells were white garnet. Two possible explanations are given: (1) the garnet eye was derived from a cell in which during somatogenesis the white gene either mutated to red or was lost or inactivated; (2) the mosaic individual was derived from a binucleated egg-cell fertilized by 2 Y-bearing sperm.—*Alexander Weinstein.*

3242. PEAKE, H. J. E. The study of man. *Nature* 110: 516-521. 1922.—The contrast is pointed out between the "evolutionary school" and the "historical school" of anthropology, both believing in evolution, but the latter assuming that a given culture complex evolves but once and is subsequently transmitted from one people to another. The modern tendency is not to assume an independent origin for any custom until it has been proved that such could not have been introduced from some other area.—An increasing interest of sociologists and economists in anthropology, which is defined as "the study of the origin and evolution of man and his works" and considered as a department of zoology, is noted. The ways in which backward peoples are studied have great value for the anthropologist. "The time seems to have arrived when anthropologists should not concentrate so exclusively upon these lowly cultures, but might carry on their researches into those civilizations which have advanced further in their evolution." Great need exists for anthropological studies in China, Japan,

and India. Such studies by Indian and British students would tend to lessen the gap between these 2 peoples. Evil results of lack of anthropological point of view are noted on both sides. A renewed plea is made for a full training in anthropology for candidates for the Indian civil service. The need for an institution in India, similar to those at Athens and Rome, for post graduate study in Indian problems, is pointed out. The urgency of the anthropological problems in the near East is emphasized, as also the value of anthropological factors in efforts towards mutual understanding in connection with the League of Nations and Versailles Treaty. There is also need for anthropological study of Christendom, including the British Isles. Much of the ill feeling engendered everywhere in the world is the product of misunderstanding due to a lack of the anthropological point of view.—*William K. Gregory.*

3243. POPENOE, PAUL. *Eugenics and Islam*. 2nd Internat. Congress Eugenics. Vol. II. *Eugenics in race and state*. 443-448. Williams & Wilkins Co.: Baltimore, 1923.—This paper discusses beliefs and practices of Arabs thought by the author to be of eugenic value. They include sound ideas of the importance of heredity and genealogy, consanguineous marriage, emphasis on necessity of marriage and parenthood, and subsidies distributed by religious foundations to the superior part of the population. On the dysgenic side, war, slavery with accompanying concubinage, and indiscriminate charity are mentioned. Polygamy is held to operate both eugenically and dysgenically.—*Paul Popenoe.*

3244. POPENOE, PAUL. *Twins raised apart*. Jour. Heredity 13: 142-144. 1 fig. 1922.—An account is given of the lives of 2 girls, evidently identical twins, who were separated at an early age. In his summary the author states that "When 2 individuals are separated in infancy, brought up as differently as were the twin sisters described above, and still manifest such mental similarities, it is impossible to resist the conclusion that the psychical make-up of the individual is very largely settled by the time he is born."—*R. C. Cook.*

3245. POPENOE, WILSON. *The tree Dahlia of Guatemala*. Jour. Heredity 11: 265-268. 1920.—Four types of tree Dahlias are found in Guatemala; single and double-flowered whites and single and double pinks are most common. Climatic conditions have hitherto restricted the growing of these plants to warmer regions. They are however so variable that the author thinks they would offer the nurseryman excellent material for experimental breeding. They attain a height of 15-18 feet and have beautiful flowers 4-5 inches in diameter.—*Edith Lang.*

3246. PRASAD, RAM. *Note on the probability of an inter-relation between the length of the stigma and that of the fibre in some forms of the genus Gossypium*. Agric. Res. Inst. Pusa Bull. 137. 7 p., 1 pl. 1922.—A yellow-flowered variety of cotton, improved by selection, was found to have become contaminated by accidental hybridization with a white-flowered variety having shorter fiber. Yellow being dominant, roguing on basis of petal color was impracticable. The presumable heterozygotes, having yellow flowers and short fiber, were found to have also shorter stigmas. Several varieties and strains of Asiatic and American cottons were then examined and a general correlation between varietal means for stigma length and fiber length was detected.—*T. H. Kearney.*

3247. PRING, G. H. *A new hybrid Nymphaea*. Ann. Missouri Bot. Gard. 9: 325-327. Pl. 20-22. 1922.—The new fertile hybrid named "Mrs. G. H. Pring," Pring was obtained from the cross *N. ovalifolia* × *N. "Mrs. Edwards Whitaker"*.—*J. Ben Hill.*

3248. REUTER, M. *Hermaphroditismus beim Wild*. [Hermaphroditism in game.] Zeitschr. Forst.- u. Jagdw. 53: 669-685. 1921.—A general discussion is presented amplified with examples of hermaphroditism in game animals and in feathered game.—*J. Roeser.*

3249. RICHMOND, I. J. *A. N. Jones—plant breeder*. Jour. Heredity 13: 103-107. 4 fig. 1922.—An account is given of the plant breeding work of A. N. Jones, Batavia, New York. The ancestry of many of Jones' wheat hybrids and a short note on his work in bean breeding

are included. Vegetative propagation of wheat by root separation was practiced by Jones to increase his stock of valuable forms. Thus, from a single grain planted in July, 1888, he harvested 27.5 pounds of wheat the following summer.—*R. C. Cook.*

3250. ROBBINS, RAINARD B. **Selection through the choice of seeds from dominant plants of an allogamous population.** *Genetics* 7: 508-512. 1922.—The author considers the problem of selection involved in choosing seed from plants showing a certain dominant character, while no effort is made to influence the source of pollen.—*Merle C. Coulter.*

3251. ROSANOFF, AARON J. **Inheritance of mental disorders.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 170-173. Williams & Wilkins Co.: Baltimore, 1923.—The following facts concerning the inheritance of mental disorders are considered: (1) heritable nature of certain mental disorders; (2) atavistic heredity; (3) dissimilar heredity; (4) constitutional mental disorders behave like Mendelian recessives in their manner of transmission by heredity; (5) clinically distinguished entities bear to one another and to normal mental states some sort of relationship, as shown particularly by so-called transitional, mixed, and borderline cases; (6) each clinical entity represents a mental trait or group of traits varying quantitatively within wide limits; (7) each seems to present possibilities of qualitative variation which has led clinicians to the conception of neuropathic equivalents; (8) each mental trait, as exhibited by the clinical entities, seems to present 2 aspects for consideration, a temperamental aspect, whereby it is qualitatively distinguishable from other traits, and an intellectual aspect, which is not specific for a given trait and which seems to vary only quantitatively. Some problems in eugenics in relation to mental disorders are briefly discussed. One of the most urgent tasks of fundamental research is judged to be the devising of methods for the more precise measurement of temperamental traits.—*Aaron J. Rosanoff.*

3252. SADLER, WILLIAM S. **Endocrines, defective germ-plasm, and hereditary defectiveness.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 341-350. Williams & Wilkins Co.: Baltimore, 1923.—The present status of opinion in America regarding the relative frequency of defective germ plasm and disturbances of the functions of the internal secretory glands as the cause of mental defectiveness, social delinquency, and certain of the insanities is discussed. Is dementia praecox an inheritance or an acquirement? The relation of this, the chief form of insanity, to disturbances of the endocrine system of the body is reviewed. A consideration is given as to what extent the dullards and backward children of this and the next generation may expect to find relief and help in the administration of hormones or ductless gland substances from the lower animals and to the fact that mental defectiveness and other hereditary abnormalities are so frequently associated with disfunction of some sort in the endocrine system. The author then treats of the relation of hormones in prenatal life to deformity and the possible inheritance of acquired characters, and a discussion of Guyer's recent work in this connection. Consideration is given to alcohol and syphilis in their possible rôle as racial poisons in relation to apparent inherent defectiveness. Suggestions are made for further research and experimental inquiry as to the rôle of the hormones of the endocrine system in relation to hereditary defectiveness.—*William S. Sadler.*

3253. SALAMAN, REDCLIFFE N. **The influence of size and character of seed on the yield of potatoes.** *Jour. Agric. Sci.* 12: 182-196. 1922.—Potato seed pieces of different sizes, (26, 12, 8, 6, 4, and 3 pieces per pound, mixed unselected, and pieces with outgrowths of various sizes), were planted on the checker-board system. The yield data are carefully analyzed, from which it is concluded that the total yield of potatoes varies directly with the weight of the seed piece. Seed pieces of 2 ounces in weight were the most remunerative. There is no correlation between the presence of secondary growth in the seed set, and the existence of the same in the resultant crop; in fact, some of the best results were obtained from sets with outgrowths. An inverse ratio between the size of the seed piece and the percentage of heavy tubers in the resultant crop was found; this, and the productivity of secondary growths, may be correlated with immaturity of the seed tubers.—*G. R. Bisby.*

3254. SANDSTEN, E. P., and C. M. TOMPKINS. **Degeneration in Colorado potatoes.** Colorado Agric. Exp. Sta. Bull. 278. 15 p., *illus.* 1922.—Plots of Russet Burbank and Brown Beauty varieties of potatoes were planted using best hand selected seed, best culls, and poorest culls, which gave, respectively the best average, the next best, and the worst yields. The authors state that degeneration in Colorado potatoes is caused primarily by lack of proper seed selection, and that "degeneration is not of a permanent nature." It is considered that deformed tubers derived from good stock will produce normal tubers under favorable conditions.—*G. R. Bisby.*

3255. SAUNDERS, E. R. **Address to the Botanical Section.** Rept. British Assoc. Adv. Sci. 1920: 169-190. 1920.—This address briefly reviews progress of genetics since Mendel, calling particular attention to: (a) Effects of numerous factors on same character. Under this head the writer cites her own work with stocks to show that hairiness depends on the simultaneous presence of at least 4 dominant factors, in the absence of any 1 of which the plant is glabrous. The obverse of this picture is presented by Nilsson-Ehle's discovery that the ligule in the oat is dependent on the presence of any 1 of 5 factors, the ligule being absent only when all 5 are recessive. (b) Effect of 1 factor on widely different characters of the organism. In support of this the speaker cites Heribert-Nilsson's willow crosses from which that author concluded that the specific differences depend on a very few factor differences but that each factor influences a number of characters, although perhaps the results might be said only to prove factor differences in a few pairs of chromosomes. In this connection it is also shown that in *Datura* so-called specific differences segregate in the same way in which varietal ones do in the cross between *D. Stramonium* and *D. Tatula*. (c) Linkage phenomena. Under this head are cited the case of linkage between the factor for plastic color in stocks with factors for sap color intensity and that of the linkage of the factors for flower color, standard form, and pollen shape in the sweet pea. Following this, mention is made of the phenomena of crossing over as exhibited in these plants. This leads the author into a discussion of some length as to the explanation of crossing over. She points out that if it could be shown that segregations take place at more than one time in the life history it would be possible to explain crossing over on the reduplication hypothesis, although she says nothing about how this might explain the original linkage. There follows a sympathetic outline of the chromosome theory of crossing over and linkage as presented by Morgan and his colleagues. She points out, however, that there are cases known in which the present theory is apparently inadequate. She cites the case of stock crosses involving the white-cream and single-double factor pairs in which hybrid plants produce no pollen carrying either of the dominant (white and single) factors. She inclines to reject Morgan's suggestion of lethal factors and to regard pre-meiotic segregation as a more probable hypothesis. The paper concludes with some observations on the relative share of nuclei and cytoplasm in the organic response to environmental stimuli during development.—*L. L. Burlingame.*

3256. SAX, KARL. **Sterility in wheat hybrids. II. Chromosome behavior in partially sterile hybrids.** Genetics 7: 513-552. 3 pl. 1922.—The chromosome numbers obtained by Sakamura [see Bot. Absts. 3, Entry 285] in root-tips were confirmed in pollen mother cells. In *Triticum monococcum*, 7 bivalents were found at the late prophase and metaphase of the 1st division. The attachment of the fibres was subterminal. In the pollen mother cells of *T. durum* and *T. polonicum* there were 14 bivalents. In *T. Spelta* and *T. vulgare*, 21 bivalents were seen before the 1st division. There was apparently little difference in the sizes of the individual chromosomes. Sakamura's count of *Secale cereale* was confirmed, 7 bivalents being noted. In the cross of *T. monococcum* by *T. turgidum*, at the 1st division, about 7 bivalents and approximately 7 univalents were seen, the latter usually at the poles. The univalents did not divide until the 2nd division; a result differing from that found in the crosses between wheat with 14 pairs and wheat with 21 pairs of chromosomes, in which Kihara's findings [see Bot. Absts. 2, Entry 946; 4, Entry 627] were confirmed, namely that the 7 univalents divide at the equator after the 14 bivalents have divided, and do not divide again. In the F_1 plants from the cross of wheat with 7 pairs and wheat with 14 pairs, only about 2-3 per cent of the pollen grains

appeared normal; while in the crosses of 14-pair by 21-pair wheat, about 80 per cent appeared perfect. The pollen-grains increase in volume in the uncrossed wheats, as the number of chromosomes increases; but usually in less than arithmetical proportion. The pollen size is much more variable in the F_1 of the cross between wheats with 14 and 21 pairs, than in crosses between species with the same number of chromosomes. In the F_1 of crosses, pollen, ovule, and embryo abortions are looked on as mainly due to harmful chromosome combinations. The greater sterility in certain F_2 plants is regarded as caused, in addition, by somatic weakness.—*John Belling.*

3257. SAX, KARL. Sterility in wheat hybrids. III. Endosperm development and F_2 sterility. *Genetics* 7: 553-558. 1922.—*Triticum durum* and *T. vulgare* were crossed both ways. The parent varieties had respectively 2.7 and 2.2 grains per spikelet; while the F_1 plants averaged 0.6 and 0.5 in the 2 crosses. The individual weights of the grains borne on the F_1 plants varied much more than did those of the parent plants. From a single F_1 plant, 78 grains germinated; but 17 of these seedlings failed to flower; and of the 61 plants which flowered, 14 set no grain. Only 1 (or 2) of these F_2 plants had as much fertility as the grandparents. The mean number of grains per spikelet in the 61 plants which flowered was 0.8, with a standard deviation of over 0.6. Among the 47 plants which set seed, there was about zero correlation between the weight of the grain from which a plant grew and the number of grains it produced per spikelet.—*John Belling.*

3258. SCHAFFNIT, E. Neuere Untersuchungen über die Brennfleckenkrankheit der Bohnen. [Recent investigations of the anthracnose of beans.] *Beitr. Pflanzenzücht.* 6: 25-34. 1922.—The author's observations on spore germination, appressoria formation, penetration of host, development of the pathogen within, and the effect upon the host tissues are presented. Cell changes following invasion involve enlargement of nucleus and nucleolus, and conversion of the chlorophyll to "phaophytin." The cytoplasm becomes granular and crumbly, but the starch remains unaltered. Paraphysis-like bodies distinct from spines were observed among the conidiophores. Weather and soil conditions as well as methods of planting favorable for the development and spread of the pathogen are pointed out. The greater prevalence of the disease on bush than on pole beans is due in part to greater humidity of air near the ground. Attempts are being made to breed a resistant erect type with fleshy tender pods containing white seed. Not much difference was observed in the amount of disease on inoculated plants fertilized with unbalanced solutions or when over-nourished or under-nourished with either nitrogen, phosphoric acid, or potassium, although there were considerable morphological and anatomical differences. Over-fertilizing with nitrogen aids the development of the fibrovascular bundles while under-feeding hinders it. The phloem develops strongly with potash over-feeding, weakly with under-feeding. Plants over-fertilized with phosphoric acid were injured by the treatment. There was a greater development of woodiness in the suture tissues of pods in case of plants over-fertilized with either nitrogen or potash as compared with those under-fertilized, while the reverse was true when phosphoric acid was used. It was found that infection and spore formation followed inoculation of susceptible varieties within 8 days while it took 30 days in case of resistant varieties. The starch in the cells of resistant and immune varieties is converted to sugar much more slowly than in susceptible ones. Hydrolysis of protein is accelerated through the action of the enzyme of expressed sap of susceptible beans. There is a correlation between the degree of resistance and the kinetic energy of catalase reaction. The curve of rapidity of action for very susceptible varieties is almost horizontal while for immune varieties it falls off rapidly. The curve for moderately susceptible ones lies between the 2.—*M. F. Barrus.*

3259. SCHULTZ, ADOLPH H. Zygodactyly and its inheritance. *Jour. Heredity* 13: 113-117. 4 fig., 3 charts. 1922.—Webbing between fingers and toes is called zygodactyly. It is normally present in early development and may in rare instances persist throughout life as a developmental arrest. In the foot the persistence of the webbing seems to occur always between the 2nd and 3rd toes. Skin-fusion between these toes is found in many marsupials and in the

Siamang apes. When present in man the tendon of the long extensor muscle for toes two and three is unsplit for an unusually long distance. In no zygodactyl family does the anomaly skip a generation. The chance for the female to transmit webbed toes is very much less than for the male, and female progeny in general is less apt to inherit zygodactyly than male progeny.—A. H. Schultz.

3260. SHAMEL, A. D. A bud variation of the Le Grande Manitou Dahlia. Jour. Heredity 10: 367-368. 1 fig. 1919.—The typical flowers of this Dahlia have white petals striped and speckled with violet. On 2 plants of this variety there have been produced self-colored violet flowers, having the number, shape, and size of the petals different from the typical flowers on the same plants.—Edith Lang.

3261. SHERWOOD, R. M. Correlation between external body characters and annual egg production in White Leghorn fowls. Texas Agric. Exp. Sta. Bull. 295. 12 p. 1922.—A study was made on 28 White Leghorn hens near the close of their first laying year. The correlation coefficients obtained follow:

Characters correlated	Correlation
Color of shanks—annual egg-production.....	-0.622 ± 0.037
Color of beak—annual egg-production.....	-0.603 ± 0.038
Pliability of pubic bones—annual egg-production.....	+0.472 ± 0.046
Handling qualities—annual egg-production.....	+0.431 ± 0.048
Number of primary wing feathers molted—annual egg-production.....	-0.522 ± 0.043
Body weight—annual egg-production.....	+0.009 ± 0.060
Width of pelvic arch—body weight.....	+0.216 ± 0.057
Width of pelvic arch—annual egg-production.....	+0.210 ± 0.057
Ratio of width of pelvic arch to weight—annual egg-production...	+0.178 ± 0.058
Capacity—body weight.....	+0.468 ± 0.047
Capacity—annual egg-production.....	+0.093 ± 0.059
Ratio of capacity to weight—annual egg-production.....	+0.100 ± 0.059
Depth of body—body weight.....	+0.645 ± 0.035
Depth of body—annual egg-production.....	+0.174 ± 0.058
Ratio of depth of body to weight—annual egg-production.....	+0.149 ± 0.058
Length of keel—body weight.....	+0.384 ± 0.051
Length of keel—annual egg-production.....	+0.208 ± 0.057
Ratio of length of keel to weight—annual egg-production.....	+0.120 ± 0.059

—F. A. Hays.

3262. SHULL, A. FRANKLIN. Sex determination in rotifers. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 138-141. Williams & Wilkins Co.: Baltimore, 1923.—The term "sex determination" as applied to factors affecting mode of reproduction in rotifers is justified, since sex in these animals is much more closely related to the life cycle than in aphids and Cladocera. Factors affecting life cycle, and hence sex, of rotifers are heredity, chemical substances, nutrition, and long-continued absence of bisexual reproduction. The effect on the life cycle is produced suddenly in the maturation of egg, but does not affect the chromosome number. The change is probably of a chemical nature, and may be merely 1 stage in a series of gradual changes. A metabolic theory may not be favored by results on rotifers, but is certainly not opposed by them. However, the author does not think of a critical change as occurring at a given "metabolic level," this expression being probably inapplicable to rotifers and perhaps representing unessential features in other animals.—A. Franklin Shull.

3263. SINOTO, YOSITO. On the nuclear divisions and partial sterility in *Oenothera Lamarckiana*, Ser. Bot. Mag. Tokyo 36: 92-98. 1922.—The studies were based on a culture derived from *O. Lamarckiana* now growing wild in Japan. Counts of more than 1,000 pollen mother-cells showed about 50 per cent with pairing of chromosomes or with regular nuclear plates.

This percentage is believed to correspond to the 50 per cent of perfect pollen grains. The following irregularities were noted in the distribution of chromosomes; 8+6 and 9+5 noted in both heterotypic and homotypic mitoses; division or fragmentation of the chromosomes on spindles suggesting degeneration; chromosomes in both divisions left outside of the anaphasic group either to degenerate or to form small extra nuclei; non-disjunction; more than 14 chromosomes occasionally formed in the heterotypic mitosis. He reports for somatic mitoses the segmentation of the spirem first into 7 sections and then the transverse division of each section to give the diploid number of 14 chromosomes which are thus held to be paired end to end. Seed germination occurred in about 35 per cent of the seed-like structures. Among the seedlings *albida*- and *oblonga*-like forms appeared and *nanella* was in high percentage.—*B. M. Davis.*

3264. SIRKS, M. J. [Dutch rev. of: LEHMANN, E. *Die Theorien der Oenotheraforschung. Grundlagen zur experimentellen Vererbungs- und Entwicklungslehre.* (Theory in Oenothera studies. Foundation for the experimental study of heredity and development.) 526 p. 207 fig. Gustav Fischer: Jena, 1922.] *Genetica* 4: 470-474. 1922.

3265. SIRKS, M. J. [Dutch rev. of: STOMPS, T. J. *De stoffelijke basis der erfelijkheid bij planten en dieren.* (The material basis of heredity in plants and animals.) 270 p., 24 fig. Erven F. Bohn: Haarlem, 1922 (see Bot. Absts. 12, Entry 420).] *Genetica* 4: 543-544. 1922.

3266. SIRKS, M. J. [Dutch rev. of: TSCHULOK, E. *Deszendenzlehre (Entwicklungslehre). Ein Lehrbuch auf historisch-kritischer Grundlage.* (The doctrine of descent (evolution). A text book on the historical critical basis.) 324 p. G. Fischer: Jena, 1922.] *Genetica* 4: 556. 1922.

3267. SPÄRCK, R. *The conditions of sex-change in the oyster (Ostrea edulis).* *Nature* 110: 480. 1922.—In the Limfjord, on account of lower temperature, attainment of sexual maturity is delayed and duration of male stage is prolonged beyond that found by Orton (see Bot. Absts. 12, Entry 1810). Duration of female stage is shortened and observations on marked specimens show that change from female to male condition may take place in less than a week. Decrease in number of oysters in northern stations is accounted for by effect of lower temperature on breeding.—*R. E. Clausen.*

3268. SPERLICH, A. [German rev. of: SPERLICH, ADOLPH. *Über phyletische Potenz. (On phyletic potency.)* Sitzungsber. Akad. Wiss. Wien [Math. Nat. Kl.] 128: 379-475. 4 pl., 4 fig. 1919.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 93-96. 1922.

3269. TERRY, R. J., and LEE D. CADY. *Comparison of the incidence of the supracondyloid process in groups with normal and abnormal mentality.* 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 174-177. Williams & Wilkins Co.: Baltimore, 1923.—There are in the literature reports indicating a very much greater frequency of the variation known as the supracondyloid process of the humerus among insane people than in those of normal mentality. Results of recent studies in living subjects do not bear out this conclusion. The incidence of persons presenting a supracondyloid process of 3 mm. or more in height in 515 adult whites, apparently mentally normal, was 1.16 per cent; in 1,000 insane whites, 1.2 per cent for process 3 mm. or more in height. It is to be noted that the insane patients were taken at random and included a large number with no family history of insanity.—*R. J. Terry.*

3270. THAYER, PAUL. *A variation in the Downing gooseberry.* *Jour. Heredity* 13: 284. 1922.—Goosebeery plants were found in a Downing plantation in Ohio which differed from Downing in that the leaves were long and narrow instead of nearly as broad as long and the bushes completely or nearly barren. It is suggested that this variation may be due to an obscure disease or possibly is a spurious strain or variety like the off-type lemon trees found by Shamel.—*Richard Wellington.*

3271. TOWER, WILLIAM LAWRENCE. **Darwinism. An analysis by observation and experiment. A digest and preliminary statement of results.** *Genetica* 4: 417-442. 1922.—An account is given of several observations and experiments designed to determine whether those individuals which survive and reach maturity do so because they are superior to their fellows, as postulated by the hypothesis of natural selection, or because they chanced to fall under more favorable conditions of life. Studies of mimicry in Lepidoptera based upon 220 censuses of 10 plots in the valley of the Rio Motzorongo in Mexico in which 2,219,754 pairs of wings were obtained in an 8-year period showed that only 0.50 per cent of elimination was due to vertebrate predacious enemies which were assumed to act selectively, and that the percentage of elimination in model and mimic was the same. In the same collection of wings comparisons of eliminated members of species, supposedly protectively colored, with the non-eliminated individuals disclosed no difference between the 2 groups. Observations of habits of protectively colored species also failed to demonstrate that they make use of their protective resemblance as a means of concealment. Stocks of *Leptinotarsa panamensis*, a species the eggs of which have a very thin shell highly susceptible to desiccation, were taken from their normal habitat and transported to 13 stations selected for variation in moisture conditions. The beetles became established in moist stations, but failed in the drier ones because the eggs dried up; there was no evidence of differential survival. Seeds of *Solanum rostratum*, *S. Herthwigii*, and *S. lanceolatum* were sown on plots in the natural condition and on others prepared by removal of vegetation. Under natural conditions 10,335 seed out of 260,000 germinated; on prepared plots 228,742 out of 260,000 germinated. Populations of 4 species of beetles, *Leptinotarsa signaticollis*, *L. undecimlineata*, *L. diversa*, and *L. decemlineata*, were counted and separated in each case into 2 lots,—one returned to a plot in the natural condition for aestivation, the other to a finely spaded and prepared plot. Under favorable conditions 67,977 out of 86,070 survived; under natural conditions only 5,709 out of 86,070 survived. The author concludes that all these observations and experiments show that elimination under normal conditions is a function of chance position relative to eliminating forces and that there is no evidence of survival based upon adaptive characteristics.—*R. E. Clausen.*

3272. TRABUT, LOUIS. **Sur les origines du figuier.** [On the origin of the fig.] *Rev. Bot. Appl.* 2: 393-396. 1922.—There has been an uncertainty in regard to the native habitat of *Ficus Carica*, the generally admitted mother species of the cultivated fig. The author believes this species has been derived by the intercrossing of a rather large number of species. This hypothesis is based upon the fact that the flowers are fertilized indiscriminately by the insect *Blastophaga* and that innumerable cultivated varieties exist.—*Richard Wellington.*

3273. TRESIDDER, DONALD B. **Oestrus and fecundity in the guinea-pig.** *Amer. Nat.* 56: 347-359. 1922.—A dioestrus cycle every 16 days, with variations, continues throughout the year in non-pregnant female guinea-pigs. Copulation prolongs dioestrus in multiples of 15 days; underfeeding also prolongs it especially when it occurs late in the cycle. Sexual activity lasts 24 hours; the females usually mate most freely during the early part of the period, although the behavior varies. Macroscopical signs of heat are unreliable. Fall matings are most favorable, for which the males are partially responsible. Young females constantly with males were found to mate earlier than those isolated. Successful mating may occur 1-6 hours after parturition. The writer found the average number of fetuses per pregnancy to be 3. There is a close agreement between the number of corpora lutea in an ovary and the number of implantations in the corresponding horn of the uterus, although migration of ova and the absorption of embryos are not uncommon. The writer has found that palpating guinea-pigs reveals with certainty, (1) the number of embryos after the 15th day, and (2) the presence of large cystic ovaries.—*H. W. Feldman.*

3274. TURESSON, GÖTE. **The genotypical response of the plant species to the habitat.** *Hereditas* 3: 15-350. 79 fig. 1922.—Shade and sun forms, succulent and thin-leaved forms, inland and coastal forms, dwarf salt-marsh and taller lowland forms were grown in cultures under like conditions. If under like conditions they were identical, the differences found under various conditions were attributable to habitat. If, however, they still showed mor-

phological or habit differences, the different forms were crossed and the F_1 and F_2 generations studied. In this way it was possible to distinguish between mere habitat types and hereditary types. Records were made of character of leaf, of leaf margin, of inflorescence, of angle of stem, etc. In this study an attempt was made to ascertain whether the existence in nature of such forms is the result of an advantageous response on the part of the individual or whether these forms are brought into existence through a genotypical response of the species-population to definite habitat conditions." Shade and pasture forms of *Lysimachia vulgaris* were found to be only habitat forms, while the shade forms and pasture forms of *L. nummularia* remained distinct when grown in a similar environment. *Dactylis glomerata* var. *lobata*, the shade form, although resembling the sun form when grown together under identical conditions did not lose its distinctive character and is therefore regarded as an hereditary shade form and one not due entirely to environment.—A comparison was made of the salt marsh dwarf forms transferred and compared with the taller lowland form. *Aster tripolium* var. *diffusus* and the ordinary *A. tripolium* showed what seemed to be hereditary differences, although habitat modification was also shown. *Succisa pratensis* var. *nana* from the natural salt marshes seemed to be made up both of the hereditary dwarf form and of habitat dwarfs. *Centaurea jacea* var. *humilis* from salt meadows was made up of a heterogeneous assemblage of diverse, genetically different types. Habitat conditions in the salt meadows produce a dwarf growth and make the whole population appear homogeneous. A comparison was made of succulent and thin-leaved types. *Solanum dulcaria* showed hereditary differences of 3 distinct types. Various types of *Matricaria inodora*, *Leontodon autumnalis*, and *Melandrium rubrum* indicated heritable differences. The salt plants along the coast cannot be considered entirely facultative halophytes, but should be considered obligate halophytes. *Atriplex litorale*, *A. patulura*, *A. sarcophyllum*, *Armeria vulgaris*, and *Hieracium umbellatum* showed both modificatory and hereditary biotypes. There was ample evidence of hereditary differences in the different sets of individuals. In some cases the habitat types were more homogeneous in the field than in cultures. Cultures showed the degree of masking due to habitat. The habitat type, although it may appear as homogeneous, may be represented by many distinct genotypes. This supports the theory of Nägeli rather than Lamarek. The genotypic constitution of the plant is regarded as of primary importance. Where the habitat alternates sharply the type also alternates sharply. The morphological parallelism between the modification and the hereditary variation offers proof of control of environmental factors. Where a habitat, demanding dwarf forms, is inhabited largely by hereditary non-dwarf forms, no doubt would seem to remain as to the influence of habitat factors upon the genotypical composition of the species population in certain habitats. But in the majority of cases investigated not the habitat modifications but the corresponding hereditary type was found to populate the area. If organisms are able to respond rapidly to special demands the type showing habitat modification would be expected, but if only a limited degree of modification is possible hereditary habitat types would dominate. The factor which demands extreme modification in the habitat form may easily become a limiting factor for such forms, but would not operate as a limiting factor on the hereditary forms. If the term species is limited to the isolated units of hereditary forms the species lose one of the most characteristic qualities,—the ability to respond genotypically to a wide range of habitat. The Linnean species represents an ecological unit of great importance. In order to distinguish between ecological and purely genetical units the term "ecospecies" has been proposed to cover the Linnean species or genotype compounds as they are realized in nature. The total sum of possible combinations in a genotype compound may be termed a "coenospecies." When this is narrowed down by the ecological combination limits, it may be called an "ecospecies." The ecospecies are made up of habitat types, or what might be called varieties. These ecological subtypes may be termed ecotypes. It indicates the product arising as a result of the genotypical response of an ecospecies to a particular habitat. An ecospecies may populate many different habitats and produce many different ecotypes. The ecotype may in turn be made of "ecophenes" which represent each of the reaction types of the ecotype arising through the modifying influences of the combinations of extreme habitat factors given in nature. The genetical analogies of a cenospecies is a "genospecies," of an ecotype is a genotype and phenotype, and of an ecophene is a "genophene."—H. L. Shantz.

3275. UTTIEN, H. [Dutch rev. of: NILSSON-EHLE, H. *Fortgesetzte Untersuchungen über Fatuoidmutationen beim Hafer*. (Continued investigations on the fatuoid mutations in oats.) *Hereditas* 2: 401-409. 1921.] *Genetica* 4: 475-476. 1922.

3276. UTTIEN, H. [Dutch rev. of: OSTENFELD, C. H. Some experiments on the origin of new forms in the genus *Hieracium*, subgenus *Archieracium*. *Jour. Genetics* 11: 117-122. 1921 (see Bot. Absts. 11, Entry 290).] *Genetica* 4: 477. 1922.

3277. VICARI, E. M. Hybridization and behavior. 2nd Internat. Congress Eugenics Vol. II. Eugenics in race and state. 75-77. Williams & Wilkins Co.: Baltimore, 1923.—This investigation deals with the inheritance of behavior traits from the genetic standpoint. Two homozygous races of mice were crossed: Japanese waltzing (inbred for 50 generations) and albino (inbred for 25 generations). The waltzers are very active due to their continual whirling habit; the albinos do not whirl and are more or less sluggish. The results are based on 45 Japs, 75 albinos, and 110 F₁ hybrids. In learning a simple maze problem the 2 parent races are somewhat similar with respect to (1) the number of perfect trials, (2) the number of consecutive perfect trials, (3) the average time per trial. Using the same apparatus and criterion of measurement the hybrids are neither like either parent nor intermediate between them; they are superior. This is shown in (1) the number of consecutive perfect trials, (2) the total number of perfect trials, (3) the length of time in going through the maze. The facts show that the phenomenon of heterosis may also be found in behavior traits.—E. M. Vicari.

3278. VUILLEMIN, PAUL. Disjonction et combinaison des caractères des parents dans un hybrid. [Segregation and combination of parent characters in a hybrid.] *Compt. Rend. Acad. Sci. Paris* 175: 353-355. 1922.—Hybrids from a cross between a 5-spurred and a spurless *Aquilegia* show the dominance of the spur character. The influence of the recessive character was measured by the decrease in the number of spurs on the flowers of each succeeding generation. Two factors modify the type of flowers: (1) segregation of characters transmitted by the parents; (2) increasing the combination of characters. The combination of dominant and recessive characters is emphasized by the increasing preponderance of flowers with 3 spurs.—H. C. McPhee.

3279. WAGENSEIL, F. [German rev. of: KLATT, B. *Mendelismus, Domestikation und Kraniologie*. Mendelism, domestication, and cranology. *Arch. Anthropol.* 18: 225-250. 4 fig. 1920.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 213. 1922.

3280. WALTER, H. E. *Genetics: an introduction to the study of heredity*. Rev. ed., xvi + 354 p., 92 fig., 6 diagr. Macmillan Co.: New York and London, 1922.—His text book is designed to present the salient points of genetics in an elementary manner. The general plan in the revised edition remains the same as in the 1st edition, but the subject matter has been worked over to bring in recent advances in genetics. The revised edition is divided into 15 chapters, instead of 12; the subject matter has been enlarged from 262 to 336 pages; and the number of figures increased from 72 to 92. The revised edition opens with a general orientation which is followed by a discussion of variation. A treatment of the origin of heritable differences then leads to a prolonged discussion of the inheritance of acquired characters. The author concludes this discussion with the same statement as in his previous edition, that the weight of evidence is against belief in the inheritance of acquired characters. Mendelism is next considered; independent unit characters, segregation, and dominance are characterized as the trinity of Mendelian principles. In the chapter on pure lines and selection the results of numerous selection experiments are described and in the next chapter on the factor hypothesis the conclusion is reached that selection is effective (1) by isolation of pure lines; (2) by elimination or addition of modifying genes; and (3) by mutation of genes. Blending inheritance is developed as an expression of the action of multiple factors. The following chapter discusses atavism and reversion, and methods of animal and plant breeding. The chapter on the carriers of the heritage is shifted from 2nd to 10th place in the revised edition. It is followed

by a chapter on the architecture of the germplasm which is new and which gives a brief account of the *Drosophila* investigations. At this point another new chapter on somatogenesis, "the hereditary tunnel," is inserted in which the main features of development are set forth. The chapter on sex determination has been rewritten and enlarged. The book closes with chapters on the application to man and human conservation. A list of books and recent general works is included.—*R. E. Clausen.*

3281. WEATHERWAX, PAUL. **A rare carbohydrate in waxy maize.** *Genetics* 7: 568–572. 1922.—The endosperm of the Chinese waxy type of maize has been shown to consist entirely of a hitherto rare and ephemeral carbohydrate, erythrodextrin, a dextrin which stains red with iodine. The value of this discovery in the genetic analysis of this character is pointed out and the further suggestion is advanced that a consideration of the fundamental physical and chemical nature of the endosperm of sweet corn would harmonize the somewhat divergent views of maize inheritance now in existence. The Asiatic distribution of the cereals having the carbohydrate erythrodextrin is noted, but no significance is attached to this fact.—*J. H. Kempton.*

3282. WHITING, P. W. **Heredity in the honey bee.** *Jour. Heredity* 13: 2–8. 3 pl. 1922.—Inheritance in the honey bee is recognized as of crisscross type due to the fact that drones arise from unfertilized eggs and thus inherit maternal characters only. The 3 castes, workers, queens, and drones, are strikingly different from each other. Queens and drones show degeneration of worker instincts, due to "parasitic life on worker colony." Great specialization of the 3 casts is noted, and the problems of heredity involved in the inheritance of these differences are discussed from the point of view of genetics, phylogeny, and physiology. Determination of sex is not due to the source of the germinal material, but to its quantity,—a simplex genetic assortment producing a male, a duplex assortment a female, either a queen or worker, depending on the feeding. The high specialization of the honey bee colony has made for greater efficiency.—*R. C. Cook.*

3283. WHITING, P. W. **The analysis of genetic differences through haploid parthenogenesis.** 2nd Internat. Congress Eugenics Vol. I. Eugenics, genetics and the family. 102–105. Williams & Wilkins Co.: Baltimore, 1923.—The parasitic wasp, *Hadrobracon*, reproduces males by haploid parthenogenesis, produces females sexually; also virgin females produce only males. These latter occur in a 1:1 ratio from a heterozygous mother. A variation affecting venation has its genetic basis in a single Mendelian difference, but its appearance depends upon temperature, food, and chance conditions of growth. One stock, unaffected by 8 generations of selection, shows the variation in 93 per cent of individuals. Another shows it in practically none, while there are indications that it is possible to isolate another stock with less than 1 per cent showing variation. A system of inbreeding and crossing to type stock, tests genetic constitution of each male whatever his apparent character. This system should eliminate all differences from type except the one under consideration. A sexual generation, resulting from a cross to type stock, is alternated with a parthenogenetic generation showing segregation. From the results of this type of analysis the theory is advanced, although not as yet entirely demonstrated, that whether a genetic character difference from type appears in all of the individuals possessing the genetic potentiality of showing it or in a very high ratio of the individuals or even in less than 1 per cent, the factorial basis may be a single Mendelian unit.—*P. W. Whiting.*

3284. WIELENSIEK, S. J. [Dutch rev. of: SALAMAN, R. N., and J. W. LESLEY. **Some information on the heredity of immunity from wart disease.** Rept. Internat. Potato Conference 1921: 105–111. 1922 (see Bot. Absts. 11, Entry 2899).] *Genetica* 4: 541–542. 1922.

3285. WRIGHT, SEWALL. **Another pedigree of webbed toes.** *Jour. Heredity* 13: 118. 1922.—A pedigree submitted by Dr. Ira S. Wile is presented in which the mode of inheritance is evidently as a dominant unit, with no relation to sex. Other pedigrees have been presented

in the Journal of Heredity in which inheritance of the character corresponds exactly with the transmission of the Y-chromosome. It is not especially surprising that the webbing is inherited differently in different families. Night-blindness, for instance, is a sex-linked factor in some families, and a simple dominant in others.—*R. C. Cook.*

3286. WRIGHT, SEWALL. The effects of inbreeding and crossbreeding on guinea pigs. III. Crosses between highly inbred families. U. S. Dept. Agric. Bull. 1121. 61 p., 27 fig. 1922.—Experiments for 15 years on the effects of inbreeding on guinea pigs include: the records of 23 inbred families, each descended from an original pair (over 25,000 animals); a control stock in which inbreeding was avoided (over 4,000 animals); and crosses among the inbred families (nearly 5,000 animals). Inbreeding has been carried on for over 20 generations, without obvious degeneration. On the average a decline in all the elements of vigor has occurred. A conspicuous differentiation among families has been brought to light and increased by inbreeding. Crosses between the inbred families involve: (1) first crosses between different families; (2) progeny of a first cross mated with others of a different cross; (3) brother-sister matings of crossbreds; (4) brother-sister matings continued to 2nd generation; (5) inbred females mated with unrelated crossbred males; (6) crossbred females mated with unrelated inbred males; (7) heavy animals from crossbreds selected and inbred; (8) animals from large litters mated. Seasonal fluctuations were corrected for, by comparing the average of each experiment, for the entire period in which it was maintained, with the estimated record of the total inbred stock produced simultaneously. "Crosses between different inbred families have resulted in a marked improvement over both parental stocks in every respect, due allowance having been made for the effects of size of litter on the other characters. This improvement appears to its full extent in the progeny of the first cross, in the case of adult weight (about 12 per cent) and resistance to tuberculosis (about 20 per cent). The mortality between birth and weaning is found to depend about three-fourths on the breeding of the young and one-fourth on that of the dam. There is thus a marked improvement in the first cross (about 11 per cent) in spite of the inbred dam, but there is some additional advance in the progeny of a crossbred dam with an unrelated male. In the rate of gain between birth and weaning, the breeding of the dam and of the young are about equally important. An improvement of about 16 per cent was obtained in this respect. Birth weight depends largely on the dam—about three-fourths—and only one-fourth on the breeding of the young. There is thus only a slight improvement before the second generation in which it amounted to some 9 per cent. The mortality at birth is almost wholly a maternal affair. Crossbreeding of the dam adds about 7 per cent to the chances of the young. The heredity of the young also counts for nothing in frequency or size of litter. The sire is somewhat more responsible than the dam in the former case; the dam seems to be wholly responsible in the latter. Frequency of litter was increased over 30 per cent and size of litter over 10 per cent when both sire and dam were crossbred." "Analysis of the various crosses, indicates that the results are all the direct or indirect consequence of the Mendelian mechanism of heredity. The fundamental effect of inbreeding is the automatic increase in homozygosis in all respects. An average decline in vigor is the consequence of the observed fact that recessive factors, more extensively brought into expression by an increase in homozygosis, are more likely to be deleterious than are their dominant allelomorphs. The differentiation among the families is due to the chance fixation of different combinations of the factors present in the original heterozygous stock. Crossing results in improvement because each family in general supplies some dominant factors lacking in the others. Dominance or even imperfect dominance in each unit character is built up into a pronounced improvement over both parent stocks in the complex characters actually observed. A certain portion of the increase in vigor of the first cross between inbred families is maintained on resuming random mating." The writer points to important application of inbreeding, followed by cross-breeding and resumed inbreeding, in the improvement of livestock. Progress by ordinary selection of individuals is very slow, because environment is relatively more important in determining the individuality of the animal, in economic characters, such as growth, fertility, and disease resistance.—*H. W. Feldman.*

3287. WRIGHT, SEWALL. **The effects of inbreeding on guinea-pigs.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 266-269. Williams & Wilkins Co.: Baltimore, 1923.—In experiments involving over 35,000 guinea-pigs it has been found that inbreeding has resulted in a decline in the average vigor in every respect studied, including frequency and size of litters, growth from birth to maturity, mortality at birth and later, and resistance to tuberculosis. Certain families, however, have remained vigorous after more than 20 generations of brother-sister mating. There has been a marked genetic differentiation. In general, a particular combination of vigor in some respects, with weakness in others, has become characteristic of each of 23 families. There is no correlation between the standing of a family in one respect and in others. On crossing 2 families, there is marked improvement in every respect either in the 1st or 2nd generation, depending on how far the character pertains to the young and how far to the dam or sire. The results are shown to be in accord with the Mendelian theory of inbreeding.—*Sewall Wright*.

3288. WOLLENWEBER, H. W. **Die verschiedenen Methoden der Kartoffelzüchtung unter Berücksichtigung der Krankheitsforschung.** [The different methods of potato breeding in connection with disease investigations.] Beitr. Pflanzenzücht. 6: 35-44. 1922.—Potato culture may be divided into 5 periods: (1) introduction during the 16th century; (2) dissemination and development as a field crop up to and including the 17th century; (3) describing varieties and selecting against disease, 1776-1819; (4) introducing better varieties, investigating diseases and beginning of crossing, first half of 19th century; (5) developing, distributing, breeding, and selecting disease resistant strains, second half of 19th century. Methods being used for potato improvement are selection, cross breeding, and introduction from other countries. Qualities sought are freedom from disease, adaptability to soil and climate, yield, starch content, keeping quality in storage, and special time of ripening. Qualities of the tubers depend upon size, shape, color of flesh, number and prominence of eyes. Very little has been written regarding methods of cross pollinating. The author briefly describes his method and mentions the difficulties connected with it. Besides the technique of cross breeding, the worker must be intimately acquainted with the diseases. A large number of interesting problems are suggested for the breeder of disease-resistant varieties of potatoes.—*Charles Chupp*.

3289. YULE, GEORGE U. **An introduction to the theory of statistics.** 6 ed., xv + 415 p. C. Griffin & Co., Ltd.: London, 1922.

3290. ZELENY, CHARLES. **Reverse mutation.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 113-114. Williams & Wilkins Co.: Baltimore, 1923.—Reverse mutations in bar series of multiple allelomorphs of *Drosophila* are more frequent than original ones. This frequency is not due to recent origin. The large shift from ultra-bar to full is as frequent as smaller shifts from bar to full and ultra-bar to bar. Direction of selection is not a factor. Mutations occur in germ plasms of both males and females and are not confined to a single period. The different components of the bar series are definite entities. They do not grade into one another and their origin is not a factor in their behavior.—*Charles Zeleny*.

3291. ZIEGLER, H. E. [German rev. of: GOLDSCHMIDT, RICHARD. **Die quantitative Grundlage von Vererbung und Artbildung.** (The quantitative basis of heredity and species formation.) 163 p., 28 fig. Julius Springer: Berlin, 1920.] Arch. Rass.- u. Ges.-Biol. 14: 343-345. 1922.

3292. ZIEGLER, H. E. [German rev. of: GOLDSCHMIDT, RICHARD. **Einführung in die Vererbungswissenschaft.** In zwanzig Vorlesungen. (Introduction to genetics. In 20 lectures.) 3rd ed., 519 p., 178 fig. Engelmann: Leipzig, 1920.] Arch. Rass.- u. Ges.-Biol. 14: 338-339. 1922.

3293. ZIEGLER, H. E. [German rev. of: GOLDSCHMIDT, RICHARD. *Mechanismus und Physiologie der Geschlechtsbestimmung*. (Mechanism and physiology of sex-determination.) 251 p., 113 fig. Gebrüder Borntraeger: Berlin, 1920 (see also Bot. Absts. 9, Entry 1388). Arch. Rass.- u. Ges.-Biol. 14: 340-343. 1922.

HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issue Entries 2942, 3103, 3118, 3136, 3143, 3177, 3178, 3237, 3245, 3247, 3270, 3272, 3361, 3368, 3448, 3505, 3511, 3518, 3599, 3645)

FRUITS AND GENERAL HORTICULTURE

3294. ANONYMOUS. Export of apples. New Zealand Jour. Agric. 24: 82-85. 1922.—This article reports experiments with Cox's Orange Pippin, Dunn, and Jonathan to determine the best stage of maturity for shipment.—N. J. Giddings.

3295. ANONYMOUS. Origin of the Rome Beauty apple. Jour. Dept. Agric. Victoria 19: 483. 1921.

3296. ANONYMOUS. Planting and reconstitution of vineyards. Conditions governing the distribution of *Phyloxera*—resistant vine rootlings and cuttings. Jour. Dept. Agric. Victoria 19: 318-319. 1921.

3297. ARISZ, W. H. Over den invloed van zwaar tappen op de chemische samenstelling van de latex. [The influence of severe tapping on the chemical constitution of latex.] Arch. Rubbercult. Nederland.-Indië 4: 27-29. 1920.—Trees of *Hevea brasiliensis* were severely tapped with the following results: (1) The ratio of resinous substances to rubber remained unchanged; (2) For the 1st fortnight the concentration of organic substances in the serum was unchanged, then the amount of organic substances decreased; (3) At first, the content of nitrogenous substances was unchanged, later it decreased by as much as 50 per cent; (4) The concentration of inorganic substances in the serum remained practically constant.—C. D. LaRue.

3298. BARSS, A. F. Biochemical problems in agriculture with special references to fruit. Sci. Agric. 3: 100-104. 1922.—A plea is made for more exact and searching methods of research in fruits to include physiological and genetical studies as opposed to the ordinary field experiments. A few of the more important problems requiring study are outlined.—T. G. Major.

3299. BARTLETT, R. G. Picking, grading, and packing bananas. Agric. Gaz. New South Wales 33: 897-899. 1922.

3300. BEVAN, W. Olive trees in the forests. Cyprus Agric. Jour. 17: 64. 1922.—From the Aetomouti and Carpass forests of Cyprus during the past 21 years 780,861 wild olive trees have been transplanted into olive orchards and budded with scions of desirable cultivated varieties.—Wm. Stuart.

3301. BOBILIOFF, W. De reactie van *Hevea* latex. [The reaction of *Hevea* latex.] Arch. Rubbercult. Nederland.-Indië 3: 408-410. 1919.—Latex from many trees of various ages was examined. The latex of *Hevea* generally gives an alkaline reaction. Very few trees have neutral latex.—Carl D. LaRue.

3302. BOBILIOFF, W. Over de correlatie tusschen de productie en het aantal rijen der melksapvaten in den bast van *Hevea brasiliensis*. [The correlation between production and the number of rows of latex-vessels in the bark of *Hevea brasiliensis*.] Arch. Rubbercult.

Nederland-Indië 4: 383-390. 1920.—The coefficient of correlation between yield of rubber and the number of rows of latex vessels in the bark is found by the author to be 0.55 ± 0.051 . Data from 491 trees were used in the computation.—C. D. LaRue.

3303. BOBILIOFF, W. Over den oorsprong van het melksap van *Hevea brasiliensis* on grond van proeven met geringde boomen. [The origin of the latex of *Hevea brasiliensis* as indicated by experiments with ringed trees.] Arch. Rubbercult. Nederland-Indië 4: 221-234. 1920.—When trees are girdled just above the ground a small decrease in yield is noted for a time, but later an increase is observed. This indicates that the main portion of the latex is derived from the trunk, not from the roots. The increase observed is probably due to cutting off the flow of food to the roots. Trees girdled above the tapping area show a decrease in yield. Trees girdled both at the root crown and above the tapping area show a much greater decrease in yield than when girdled above only. Pollarded trees show a still greater diminution in yield. The fact that a tree may continue to give a high yield of latex when all communication between the latex vessels of the trunk and those of the roots are interrupted is taken as an indication that in budded trees the stock will not influence the scion so far as yield is concerned.—C. D. LaRue.

3304. BUCK, F. E. Plant breeding problems as related to horticulture. Sci. Agric. 3: 86-92. 1922.—This is a discussion of the breeding work being carried out in British Columbia on strawberries, raspberries, pears, tomatoes, peas, kale, broccoli, globe artichoke, flowers, and lawn grasses. The strictly "research" phase of horticultural experimentation is also treated in a general way.—T. G. Major.

3305. CAMPBELL, J. A. Lemon culture. New Zealand Jour. Agric. 24: 205-210. 1 fig. 1922.—The importance of careful handling and marketing are discussed. Suggestions from a large California grower are given under the following headings: Varieties, blossoming period, picking, washing, storing, coloring, temperature and storage houses, resorting, grading, and packing.—N. J. Giddings.

3306. CASTELLA, F. DE. Resistant stocks. Jour. Dept. Agric. Victoria 19: 278-289, 490-499. 1921.—The present situation with regard to stocks resistant to the attacks of phyloxera is discussed. Resistance in American grapes is defined and explained. The resistant characteristics, soil preferences, climatic adaptation, and union affinities are discussed for all known species and hybrids of resistant stocks. Of the 18 species of American grapes 4 are predominantly important: *Vitis riparia*, *V. rupestris*, *V. berlandieri* and *V. cordifolia*. *Vitis californica* is the only American species which is not resistant. Few pure forms of American species are used. No one stock is ideal on account of varying adaptability. The author selects 5 fundamental stocks for Victorian (Australia) conditions, viz.: *Rupestris du Lot*, *Riparia* × *Rupestris* 3309, *Riparia* × *Rupestris* 3306, *Vinifera* × *Rupestris* A. R. G. 1, *Vinifera* × *Rupestris* 1202.—Irrigation is said to reduce the activity of phyloxera, but will not kill the insect unless submergence continues for 40 days.—Wm. E. Lawrence.

3307. HEDRICK, U. P. The pears of New York. Rept. New York Agric. Exp. Sta. 1921²: xi + 636. Frontispiece, 80 pl. (colored). 1921.—The aim of this volume as stated by the author is: "To give an account of the history and uses of the pear; to depict the botanical characters of cultivated pears; to describe pear growing in the country and more particularly in New York; and, lastly, to give in full detail the synonymy, bibliography, economic status and full descriptions of the most important cultivated pears with brief notices of varieties of minor importance . . . Biographical sketches of men who have been most prominent in pear growing in the United States are to be found in the footnotes."—The 3 species of pears of chief horticultural interest are *Pyrus communis* Linn., *P. nivalis* Jacq., and *P. serotina* Rehd. In America the pear is not grown so extensively as the apple and peach, scarcely more than the cherry and plum. Conditions of climate, pests, season of ripening, taste, and trade, account for its status of culture.—Details of gross structure of the pear of value to the systematist,

and notes as to disease resistance and susceptibility, adaptation to certain climatic and soil conditions, self-fertility or sterility, season of blooming and ripening, and adaptation to dwarf and standard stocks are given. Detailed descriptions and discussions of 91 varieties are given, and several hundred are briefly mentioned as minor varieties.—*J. H. Gourley.*

3308. JONG, A. W. K. DE. *Tapproeven bij Hevea brasiliensis.* [Tapping experiments on *Hevea brasiliensis.*] Arch. Rubbercult. Nederland.-Indië 4: 32-36. 1920.—A series of tapping experiments carried on for 6½ years is described. Different tapping systems (9) were used, and the conclusion was drawn that 2 left cuts on 1 quarter seemed the best system for conditions at Buitenzorg, Java, where the experiments were made.—*C. D. LaRue.*

3309. KERLE, W. D. The production of peanuts. A neglected industry. Agric. Gaz. New South Wales 33: 855-858. 1922.

3310. LARUE, CARL D. *Bark thickness in Hevea brasiliensis.* Arch. Rubbercult. Nederland.-Indië 4: 45-63. 1920.—The thickness of bark of *Hevea* trees decreases rapidly between points 1 and 3 feet from the ground. From the 3 foot to the 5 foot level, the increase is much slower, individual trees varying greatly. Measurements of 161 trees gave a mean thickness of 1.53 mm. left uncut in tapping. When tapping on a cut is stopped, the bark renews with great rapidity, being ⅓ the thickness of the original bark within 9-12 months. There is a correlation of 0.26 ± 0.019 .—*C. D. LaRue.*

3311. MAGNESS, J. R. The handling, shipping, and cold storage of Bartlett pears in the Pacific coast states. U. S. Dept. Agric. Bull. 1072. 16 p. 1922.—As a result of chemical and physiological studies of the past 2 years, it has been found that for fresh fruit shipment, delay of initial picking until 2 weeks after the lenticels become corked over yields a superior eating product. Pears should show a yellow ground color beneath the green before being picked for canning or storage purposes. If held at 30°F., fruit can be kept for several months. Conditions under which fruit is grown parallel its qualities; in general the districts with fairly high temperature and low humidity during the growing season produce pears with best carrying and keeping qualities.—*A. Dorothy Bergnet.*

3312. POPENOE, WILSON. The Capulin cherry. Jour. Heredity 13: 51-62. 7 fig. 1922.—The improvement of the wild black cherry, *Prunus serotina*, indigenous from Nova Scotia to Peru, has been neglected in North America, but in tropical America some excellent horticultural varieties have been developed. The best of these, Capulins, are found in the tablelands of Ecuador and Peru. Relatively inferior forms are in cultivation as far north as Mexico. Recent experiments in Ecuador indicate that propagation of the superior forms by grafting is quite feasible, and there appears to be no reason why they should not be adapted for cultivation in the U. S. A., particularly in regions where the European cherries do not thrive.—*R. C. Cook.*

3313. RAVAZ, I. et G. VERGE. *Nouvelles recherches sur les porte-greffes.* [New researches on Phylloxera-resistant grape stocks.] Ann. Ecole Nation. Agric. Montpellier 17: 227-241. 1918/1919 [1922].—These investigations confirm the phylloxera-resistant quality of *Riparia*, *Rupestris*, *Riparia* × *Rupestris*, *Riparia* × *Berlandieri*, *Rupestris* × *Berlandieri* and *Vinifera* × *Berlandieri*. Several new hybrids have given promising results.—*F. F. Halma.*

3314. ROBERTSON, W. H. Economic field problems relating to horticulture. Sci. Agric. 3: 155-156. 1922.—A brief discussion is given of soil, variety, insect and disease control, storage, precooling, and shipping problems.—*T. G. Major.*

3315. STOFFERT. *Beerenobstau nach neuzeitlichen Grundsätzen.* [Berry culture according to modern principles.] Mitteil. Deutsch. Landw. Ges. 37: 685-686. 1922.—A brief review is given of the history of berry culture in Germany, the size of the industry and the requirements for successful culture being emphasized.—*A. J. Pieters.*

3316. VRIES, O. DE. *Latex en rubber van individueele boomen. I. [Latex and rubber from individual trees. I.]* Arch. Rubbercult. Nederland.-Indië 4: 249-267. 1920.—This is a discussion of methods for obtaining data concerning latex and rubber from individual trees. Attention is called to the great variation in the properties of latex and rubber from different trees and to the desirability of the study of such variation.—*C. D. LaRue.*

3317. VRIES, O. DE. *Latex en rubber van individueele boomen. II. [Latex and rubber from individual trees. II.]* Arch. Rubbercult. Nederland.-Indië 4: 361-379. 1920.—The behavior of the latex from different trees is not always alike. The changes usually observed in the latex when a new tapping cut is opened on a tree are sometimes lacking. Within a year a given tree may show many variations in the properties of latex and rubber.—*C. D. LaRue.*

3318. WESTER, P. J. *The breadfruit.* Jour. Heredity 13: 129-135. 3 fig. 1922.—The author states that, "considering its potential value as an abundant source of nourishing and palatable food, there is no tropical fruit today so neglected as the breadfruit." An account of its introduction into the West Indies is given, and its uses are described. The yield is said to be 25 tons per hectare per annum. Lists of breadfruit varieties from Fiji, the Carolines, the Society, and the Marquesas Islands are given. The article closes with an appeal for the financing of an expedition to the South Seas to save the superior varieties which are rapidly becoming extinct.—*R. C. Cook.*

3319. WHITE, C. T. *An Australian citrus relative.* Jour. Heredity 13: 119-121. 1 fig. 1922.—All species of the genus *Microcitrus* are indigenous to Australia. Of these, one of the most interesting and least known is the Russel River Lime (*M. inodora*). Fruit of this and of Meston's Mangosteen (*Graciviana mestoni*) were collected in 1922 in northwest Queensland, one of the wettest parts of Australia. *G. mestoni* grows on the slopes of the Bellenden Ker Range, at an altitude of 2000-4700 feet. *M. inodora* was found in the dense rain forest at the foot of the range, and many trees were fruiting heavily. It forms a shrub or small tree 8-12 feet high. The fruit is 8-celled, bright lemon yellow when ripe, oblong, and may be smooth or ribbed. The larger fruits are $2\frac{1}{2}$ x $1\frac{1}{4}$ inches, but the average is somewhat smaller.—*R. C. Cook.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

3320. ANONYMOUS. *Clematis Jackmani.* Nation. Nurseryman 31: 9. 1923.

3321. BEVAN, W. *Otto of roses.—Distillation at Malikouri, 1922.* Cyprus Agric. Jour. 17: 68. 1922.—The departmental still at Malikouri extracted April 24-May 14, 1922, 130 drams of rose oil from 1416 okes of roses, a somewhat lower percentage than that of previous years. An attempt is being made to establish a commercial rose oil industry.—*Wm. Stuart.*

3322. BOYNTON, KENNETH R. *Anoda hastata.* Addisonia 7: 27-28. Pl. 238 (colored). 1922.—An ornamental, annual, herbaceous species of the family Malvaceae, native of Mexico, Central America, and the West Indies. It may be grown in flower beds in the open as far north as New York.—*T. J. Fitzpatrick.*

3323. BOYNTON, KENNETH R. *Aria latifolia.* Addisonia 7: 1. Pl. 225 (colored). 1922.—A beam-tree of the mountain ash group of the apple family, native of central Europe, was 1st found in the 18th century in the forest of Fontainebleau and is supposed to be a hybrid. It is a deciduous tree and hardy in the latitude of New York, where it has been grown for many years.—*T. J. Fitzpatrick.*

3324. BOYNTON, KENNETH R. *Billbergia saundersii.* Addisonia 7: 7. Pl. 228 (colored). 1922.—This is an ornamental epiphytic herb of the family Bromeliaceae, native of Brazil.

In 1871 it was exhibited before the Royal Horticultural Society of England by W. W. Saunders, after whom it was named.—*T. J. Fitzpatrick.*

3325. BOYNTON, KENNETH R. *Styrax japonica*. *Addisonia* 7: 13. *Pl. 231 (colored)*. 1922.—This shrub or small tree, with bellshaped, nodding, white flowers, is a native of China and Japan. It was introduced into England in 1862 and into the U. S. A. shortly before 1891.—*T. J. Fitzpatrick.*

3326. BOYNTON, KENNETH R. *Verbena erinoides*. *Addisonia* 7: 11. *Pl. 230 (colored)*. 1922.—This moss verbena, a native of Peru and Chile, is a branching annual herb, ornamental and suitable for borders.—*T. J. Fitzpatrick.*

3327. BRITTON, N. L. *Crotalaria retusa*. *Addisonia* 7: 47. *Pl. 248 (colored)*. 1922.—This ornamental annual species is a native of tropical regions, and extends northward into southern Florida and Bermuda.—*T. J. Fitzpatrick.*

3328. BRITTON, N. L. *Polystachya minuta*. *Addisonia* 7: 19. *Pl. 234 (colored)*. 1922.—This epiphytic orchid, native of Florida, the West Indies, and South America, is the type species of this large genus. The type locality is French Guiana.—*T. J. Fitzpatrick.*

3329. BRITTON, N. L. *Xylophylla epiphyllanthus*. *Addisonia* 7: 31, 32. *Pl. 240 (colored)*. 1922.—This ornamental shrub, native of the West Indies is a member of the Euphorbiaceae. In Jamaica there are 10 species of this genus, only 1 of which, *Xylophylla epiphyllanthus*, occurs in the other West Indian Islands and in Brazil.—*T. J. Fitzpatrick.*

3330. FAIRCHILD, DAVID. *Garden for the propagation of tropical and subtropical plants*. *Science* 57: 166–168. 1923.—The Chapman Field air station of 850 acres, located on Biscayne Bay, near Miami, Florida, has been turned over to the U. S. Department of Agriculture. This tract will be used for the experimental cultivation and distribution of tropical plants useful for food or for their products. A test orchard and arboretum will be built up to preserve such valuable and beautiful trees and shrubs of foreign countries as are adapted to the soil and climate.—*C. J. Lyon.*

3331. FOX, HELEN M. *Lilium candidum*. *Addisonia* 7: 51, 52. *Pl. 250 (colored)*. 1922.—The Madonna lily, native of the regions about the Mediterranean and the Black sea, is a handsome garden species and is frequently cultivated.—*T. J. Fitzpatrick.*

3332. FOX, HELEN M. *Lilium croceum*. *Addisonia* 7: 63, 64. *Pl. 256 (colored)*. 1922.—This attractive lily, native of the alpine regions of Europe, has long been in cultivation and a number of varieties are grown. Crosses with *Lilium tigrinum* have been obtained.—*T. J. Fitzpatrick.*

3333. FOX, HELEN M. *Lilium speciosum*. *Addisonia* 7: 55, 56. *Pl. 252 (colored)*. 1922.—This handsome species, native of China and Corea, 1st imported to Europe in 1832, later to the U. S. A., is a favorite garden plant.—*T. J. Fitzpatrick.*

3334. GILMORE, MELVIN R. *State historical parks of North Dakota*. *Collections State Hist. Soc. North Dakota* 6: 226–266. 1920.—The function of such a park, particularly regarding the preservation of native plants, is discussed and a list is given of “trees, shrubs, vines, herbaceous flowering plants and grasses native to North Dakota and suitable and desirable for use in planting of parks.” Many notes descriptive of the plants, their habits, and their use by the Indians are included.—*O. A. Stevens.*

3335. GLEASON, H. A. *Hamamelis mollis*. *Addisonia* 7: 9, 10. *Pl. 229 (colored)*. 1922.—This shrub, known as the Chinese witch-hazel, is a native of the provinces Hupeh and

Kiangsi, China, and it is occasionally planted in America. All species of this genus are worthy of cultivation.—*T. J. Fitzpatrick.*

3336. GLEASON, H. A. *Lopezia hirsuta*. *Addisonia* 7: 35, 36. *Pl. 242 (colored)*. 1922.—This small shrub of the Onagraceae, native of central and southern Mexico, and recently introduced into the U. S. A., is easily cultivated in conservatories.—*T. J. Fitzpatrick.*

3337. GLEASON, H. A. *Trichosporum pulchrum*. *Addisonia* 7: 43, 44. *Pl. 246 (colored)*. 1922.—This ornamental epiphyte belonging to the Gesneriaceae, native of Java, and suitable for warm-house cultivation, was discovered nearly a century ago and shortly afterwards introduced into English horticulture. It has only recently received attention in the U. S. A.—*T. J. Fitzpatrick.*

3338. GLOVER, C. C. *Quamasia esculenta*. *Addisonia* 7: 29, 30. *Pl. 239 (colored)*. 1922.—This ornamental wild hyacinth, a native of the central U. S. A., is hardy under cultivation, easily transplanted, and has an edible bulb.—*T. J. Fitzpatrick.*

3339. HOLLICK, ARTHUR. *Alnus rugosa*. *Addisonia* 7: 25, 26. *Pl. 237 (colored)*. 1922.—This is an ornamental shrub, native of eastern U. S. A. from Maine to Florida and westward to Minnesota and Texas.—*T. J. Fitzpatrick.*

3340. MACKENZIE, K. K. *Viburnum cassioides*. *Addisonia* 7: 17. *Pl. 233 (colored)*. 1922.—This viburnum is found in low damp grounds and ranges from Newfoundland to Manitoba and southward through eastern and central U. S. A. to North Carolina. It is of medium quality as an ornamental shrub. The fruit is edible, but of little value.—*T. J. Fitzpatrick.*

3341. ROSE, J. N. *Echinocereus baileyi*. *Addisonia* 7: 41. *Pl. 245 (colored)*. 1922.—This ornamental species of the cactus family, native to Oklahoma, was 1st discovered in 1904.—*T. J. Fitzpatrick.*

3342. RUSK, HESTER M. *Lilium warleyense*. *Addisonia* 7: 57, 58. *Pl. 253 (colored)*. 1922.—This species, native of central China, and discovered in 1907, is hardy and winters in the open as far north as New England.—*T. J. Fitzpatrick.*

3343. SMALL, JOHN K. *Aconogonum polystachyum*. *Addisonia* 7: 21, 22. *Pl. 235 (colored)*. 1922.—This species of the Polygonaceae, native of central Asia, is quite ornamental and is suitable for mass effect in late borders. The article includes remarks on related species.—*T. J. Fitzpatrick.*

3344. SMALL, J. K. *Tradescantia virginiana*. *Addisonia* 7: 15, 16. *Pl. 232 (colored)*. 1922.—The common spiderwort is a native of eastern U. S. A., readily adaptive to many soils quite ornamental, and easily cultivated. It was introduced into England at least as early as the forepart of the 15th century. Linnaeus made it the type of the genus.—*T. J. Fitzpatrick.*

3345. STOUT, A. B. *Lilium canadense*. *Addisonia* 7: 61, 62. *Pl. 255 (colored)*. 1922.—This species is native to the eastern portion of North America and obtains even greater distribution in cultivation. It is used in cross breeding. Seeds readily develop, but seedlings remain below the surface the 1st year. In transplanting, the old and new bulb with connecting rootstock kept intact should be moved in late autumn.—*T. J. Fitzpatrick.*

3346. STOUT, A. B. *Lilium Parryi*. *Addisonia* 7: 49, 50. *Pl. 249 (colored)*. 1922.—This beautiful species, native of southern California, 1st noted by Dr. C. C. Parry in July, 1876, has received some attention from horticulturists but is worthy of more.—*T. J. Fitzpatrick.*

3347. STOUT, A. B. *Lilium superbum*. Addisonia 7: 59, 60. Pl. 254 (colored). 1922.—A variable species, native of eastern North America, has long been cultivated in Europe and in the U. S. A. When established after transplanting it maintains itself with little care. Hybrids have been produced with *Lilium canadense*.—T. J. Fitzpatrick.

3348. STOUT, A. B. *Lilium tigrinum*. Addisonia 7: 53, 54. Pl. 251 (colored). 1922.—This favorite garden lily, native of China and Japan, was 1st introduced into England in 1804, later into the U. S. A. Several varieties are now grown. The cultivated forms do not seed, new plants being obtained from bulblets which develop in the axils of the leaves.—T. J. Fitzpatrick.

3349. STOUT, A. B. *Nicotiana Forgetiana*. Addisonia 7: 5, 6. Pl. 227 (colored). 1922.—This highly ornamental herb, native of southern Brazil, was discovered in 1901 by Louis Forget and propagated in England by Sander and Sons. It hybridizes readily, giving a rich variety of brilliant colors.—T. J. Fitzpatrick.

3350. TAYLOR, W. H. A valuable form of barberry. New Zealand Jour. Agric. 24: 159-161. 1922.—This barberry plant, probably a form of *Berberis vulgaris*, forms a very dense hedge, 10-12 feet high and 3-4 feet thick. It blossoms profusely but rarely produces fruits, hence is not disseminated by birds. Propagation is by cuttings. It produces many suckers, but these are always close to the stool.—N. J. Giddings.

3351. WILSON, PERCY. *Amorphophallus bulbifer*. Addisonia 7: 33. Pl. 241 (colored). 1922.—This species of the Arum family, native of Asia, is easily grown in gardens. Though not popular because of the ill-smelling flower, it is frequently kept as a curiosity.—T. J. Fitzpatrick.

3352. WILSON, PERCY. *Anthurium scandens*. Addisonia 7: 23, 24. Pl. 226 (colored). 1922.—This epiphytic species of the Araceae, native of the West Indies and tropical America, was 1st figured and described by Plumier. Only a few species of this genus are cultivated.—T. J. Fitzpatrick.

VEGETABLE CULTURE

3353. BONSTEEL, J. A. Soils of eastern Virginia and their uses for truck crop production. U. S. Dept. Agric. Bull. 1005. 70 p., 1 pl., 2 fig., 6 maps. 1922.

3354. HARVEY, R. B., and R. C. WRIGHT. Frost injury to tomatoes. U. S. Dept. Agric. Bull. 1099. 10 p., 1 fig. 1922.—The frost injury to tomatoes in transit from the southern states in late winter was studied mainly, but field studies are included. A difference of only 0.89°F. was found in the freezing points between certain varieties and the average of 19 commercial varieties was 30.46°F. No consistent difference was found between early and late varieties or between ripe and full grown green tomatoes of the same variety. Undercooling to 22.63°F. was found possible, when the fruit would remain unfrozen for a limited time; but a slight jar is liable to cause freezing. A thick skin with little tendency to crack is considered an important factor in frost resistance. In the field such covering favors undercooling by preventing inoculation of the tissue from ice formed on the surface. Tomatoes on the vine freeze on the upper stem-end 1st, partly because the dew is deposited on the upper end thus tending to inoculate the surrounding tissues and partly because ripe parts may freeze more easily than green parts of the same fruit.—J. T. Buchholz.

3355. MOODIE, A. W. S., J. DOUGLASS, and B. M. ARTHUR. Field experiments with sweet potatoes. Agric. Gaz. New South Wales 33: 859-862. 1922.—In a comparison of varieties imported from the U. S. A. and the local variety Pink, the imported varieties outyielded the local in 2 out of 3 cases.—L. R. Waldron.

3356. THOMPSON, H. C., and JAMES H. BEATTIE. Sweet potato storage studies. U. S. Dept. Agric. Bull. 1063. 18 p., 4 fig. 1922.—With careful handling sweet potatoes can be stored and kept for 4 months with shrinkage and decay losses nearly $\frac{1}{2}$ that accompanying ordinary commercial handling. Those stored in houses as opposed to banks or pits, not injured in harvesting, with no sorting during storage, and kept from 50–55°F. while in storage showed considerably lower losses than usual. In the experiments all the leading varieties were tested.—A. Dorothy Bergnet.

HORTICULTURE-PRODUCTS

3357. BEVAN, W. Ground nuts from Cyprus.—Cyprus Agric. Jour. 17: 45. 1922.—Cyprus-grown ground nuts examined at the Imperial Institute, London, proved sufficiently satisfactory to justify their further cultivation. The analysis of the kernels showed 5.3 per cent moisture and 49.5 per cent of oil equivalent to 52.3 per cent from the moisture-free kernels.—Wm. Stuart.

3358. HOGG, S. A. The market for passion fruit pulp. Agric. Gaz. New South Wales 33: 899. 1922.—In 1921 pulp totaling in value £10,000 was exported to London and to the U. S. A.—L. R. Waldron.

3359. REED, J. B. By-products from crushing peanuts. U. S. Dept. Agric. Bull. 1096. 12 p., 1 fig. 1922.—Data are given on relative amounts of protein, oil, sugar, starches, and fiber in by-products from peanut crushing by various industrial processes.—J. T. Buchholz

3360. VENTRE, JULES, et EMILE BOUFFARD. La potasse et les vins anormaux de 1921. [Potassium and the abnormal wines of 1921.] Ann. Ecole Nation. Agric. Montpellier 17: 169–190. Tables 1–3. 1918–1919 [1922].—The abnormality of many of the red and white wines produced in 1921 is attributed to their high potassium content. Due to drought potassium accumulated in the soil and the grapes were supplied with an excessive amount.—F. F. Halma.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 2920, 2990, 2992, 2993, 3009, 3010, 3011, 3012, 3014, 3021, 3125, 3164, 3221, 3258, 3410, 3452, 3581, 3599, 3608)

3361. BOBILIOFF, W. Enkele gegevens over de hernieuwing van den bast bij *Hevea brasiliensis*. [Some data on bark renewal in *Hevea brasiliensis*.] Arch. Rubbercult. Nederland-Indië 4: 239–247. 1920.—A year after a section of bark has been cut away in tapping, the renewed bark has developed nearly as many rows of latex vessels as there were in the original bark. In the renewed bark the ratio of the soft to hard parts is greater than in the original bark. As the bark grows older, rows of latex vessels toward the outside are destroyed by the development of stone cells. At the same time, new rows of vessels are developed by the cambium and as a result the number of rows of vessels remains practically constant.—C. D. LaRue.

3362. BREWSTER, A. A. Mucilage cells and raphides of *Hibbertia*. Australian Nat. 5: 76. 1923.—Needle-like crystals of calcium oxalate in fagot-like bundles are common throughout plants of *Hibbertia*. Mucilage cells in the petals seem to be for water storage.—T. C. Frye.

3363. COOK, O. F. Figs with misplaced scales. Jour. Heredity 13: 122–123. 2 fig. 1922.—The fruit of the fig represents a hollow branch with flowers on the inside, and normally small scales or bracts surround the aperture and the base of the stalk. In a seedling fig orchard at Bard, California, many abnormal figs were found with scales scattered over the surface of the fruit. Some fruits had only 1 or 2 misplaced scales. In others, the scales formed a regular spiral sequence or formed a distinct rim as though 2 fruits were partially formed, one inside the

other. The fleshy wall of the fruit evidently represents a series of internode elements completely fused, although the scales remain distinct.—*R. C. Cook.*

3364. DEMETER, KARL. Vergleichende Asclepiadeenstudien. [A comparative study of the Asclepiadaceae.] *Flora* 115: 130-176. 15 fig. 1922.—This is a study of the morphology of the flower and inflorescence of the Apocynaceae and the Asclepiadaceae. It supports the classification proposed by de Jussieu combining the 2 families into 1—the Apocynaceae.—*A. G. Stokey.*

3365. GAISBERG, E. VON. Zur Deutung der Monokotylenblätter als Phyllodien. [On the significance of monocotyl leaves as phyllodes.] *Flora* 115: 177-190. 3 pl. 1922.—The author, who disputes Arber's theory [Bot. Absts. 10, Entry 1816] that inverse bundles are an indication of phyllode morphology, believes that monocotyl leaves, especially those with expanded blades, represent another type of modification of a dicotyl leaf. The history of development gives no support for the phyllode theory, for in families where phyllodes appear, they are demonstrable as phyllodes in the history of development. This favors Goebel's view that a leaf of *Juncus*, like those of *Cranitzia* and *Ottoa*, is derived by reduction from a compound leaf. Inverse bundles are due to strong growth of the under side. The narrow leaves of certain *Eryngium* species, cited by Arber as of great importance for the phyllode theory since they have bundles inversely oriented, can be derived from the palmately-veined forms by stretching until the veins gradually become parallel; or, as Möbius believes, they may correspond to the expanded mid-rib or rachis of pinnate forms, the pinnae having been reduced. The leaves with expanded blades may have come from a radially formed leaf by broadening into a flat shape. The appendages formed at the tip of *Pontederia* leaves are not the vanishing remains of blades, but a later outgrowth, and so are not an argument for the phyllode theory.—*Anna M. Starr.*

3366. GLÜCK, H. Über die knöllchenartigen Niederblätter an dem Rhizom von *Marsilia hirsuta* A. Br. [The tubercle-like cataphylls on the rhizome of *Marsilia hirsuta*.] *Flora* 115: 251-258. 2 fig. 1922.—The land form of *Marsilia hirsuta* develops small, more or less globular cataphylls which are rich in starch. They appear singly on the rhizome or crowded on short lateral branches.—*A. G. Stokey.*

3367. HALL, WINSOME. Storage tracheides of stem of *Villarsia*. *Australian Nat.* 5: 84. 1923.—These tracheids are 5-9 cells long, often branched, full of pits, and abundant in pith and cortex.—*T. C. Frye.*

3368. KEUCHENIUS, P. E. Onderzoekingen over de bast-anatomie van *Hevea*. [Investigations on the bark-structure of *Hevea*.] *Arch. Rubbercult. Nederland.-Indië* 4: 5-24. 1920.—The average yearly increase in number of rings of latex vessels is from 3.13 ± 0.28 on good soil to 1.74 ± 0.12 on poor soil. The average number of rings of latex vessels for each mm. of bark from the cambium to the 5th mm. from the cambium is given.—*C. D. LaRue.*

3369. WELCH, M. B. The occurrence of oil ducts in certain *Eucalypts* and *Angophoras*. *Proc. Linnean Soc. New South Wales* 46: 475-486. Pl. 42-46, 7 text fig. 1921.—Oil ducts, not previously described, are formed by the linking up of a chain of short secretory cavities (corresponding in size and formation to the oil glands in the leaf) in the stems and leaves, both normal and abnormal, of certain *Eucalypts* and *Angophoras*, including: *E. Abergiana* F. v. M., *E. calophylla* R. Br., *E. corymbosa* Sm., *E. citriodora* Hook., *E. dichromophloia* F. v. M., *E. eximia* Schau., *E. ferruginea* Schau., *E. ficifolia* F. v. M., *E. Foelscheana* F. v. M., *E. haematoxylon* J. H. M., *E. intermedia* R. T. B., *E. latifolia* F. v. M., *E. maculata* Hook., *E. pellata* Benth., *E. pyrophora* Benth., *E. terminalis* F. v. M., *E. trachyphloia*, *E. Watsoniana* F. v. M., and in *Angophora lanceolata* Cav. Oil ducts have not yet been found in any other genera of the *Leptospermae*, and their occurrence is purely specific. There is no direct connection between these central ducts and the leaf, petiole or stem oil glands, though both structures apparently possess an oil of similar nature. These ducts are not continuous in stem and leaves, but show

a break at the petiole. They are variable in diameter and length, ranging from 0.3 mm. to less than 0.03 mm. in diameter and from over 100 mm. to less than 1 mm. in length. They apparently function as storage reservoirs. These ducts apparently do not occur in the roots nor have they been observed in the lower portions of the stems of seedlings. In the stem, they occur in the pith only. In the leaves, they are usually 2 in number and are found only in the mid-rib. The presence of these central canals in a very limited number of Eucalypts, all belonging to the class Corymbosae, indicates their primitive character, and their occurrence also in 1 species of *Angophora* shows apparently a close phylogenetic affinity between *Angophora* and *Eucalyptus*.—*Eloise Gerry*.

3370. ZIJP, C. VAN. *Microtechnische mededelingen*. [Microtechnical notes.] Arch. Rubbercult. Nederland.-Indië 4: 65-68. 1920.—Benzidine chloride is recommended for coloring lignified elements in the bark of *Hevea brasiliensis*, and Sudan III for staining latex-vessels.—*C. D. LaRue*.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See in this issue Entries 3022, 3033, 3149, 3230, 3274, 3412, 3413, 3646)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 3033, 3149, 3230, 3274)

3371. ANONYMOUS. *Nouvelles*. Rev. Bryologique 49: 48. 1922.—Among other items of interest the discovery of *Lophozia decolorans* (Limpr.) Steph., a species new to France, is announced; it was found by Knight and Nicholson in the department of Haute-Savoie.—*A. W. Evans*.

3372. AMANN, J. *Le Thamnium mediterraneum en France*. Rev. Bryologique 49: 44-46. 1922.—The author calls attention to the discovery, in southern France, of *Thamnium mediterraneum* Bottini, a species hitherto known only from the island of Giglio, Italy. He discusses the features that distinguish this species from the widely distributed *T. alopecurum* (L.) Bryol. Eur. and compares it also with the curious submerged *T. Lemani* Schnetzler of Lake Geneva and with *T. angustifolium* Holt of England.—*A. W. Evans*.

3373. ANDREWS, A. LE ROY. Further bryophytes from North Carolina (and Tennessee). Bryologist 24: 49-58. 1921.—This article is based on a collection of bryophytes made by the author during the summer of 1919 in Buncombe, Jackson, Avery and McDowell Counties, North Carolina, and in Carter County, Tennessee. It is supplementary to previous lists, upon which there are several critical notes. The list included in the paper gives the species not hitherto reported from the region and is made up of 27 hepatics, 3 sphagna and 56 mosses, with data regarding habitat and geographic distribution for nearly every species. Many of the records represent marked extensions of range. In the case of *Grimmia Doniana* and *Plagiothecium Muellerianum* systematic notes are appended, the brood-bodies of the latter species being reported and described for the 1st time.—*E. B. Chamberlain*.

3374. BAILEY, JOHN W. *Adventures in Mossland*.—A hunt for *Desmatodon latifolius* (Hedw.) Brid. Bryologist 24: 86-88. 1921.—The author gives a semi-popular account of a hunt for *Desmatodon latifolius* near Ellensburg, Washington. Although he had collected this rare moss in the vicinity several years ago he failed to find it again, but discovered a number of even rarer species. Incidentally notes are included on the habitats of mosses growing on irrigated areas, greasewood trunks, and basalt.—*E. B. Chamberlain*.

3375. BARTRAM, EDWIN B. Some rare mosses from northeastern Pennsylvania. *Bryologist* 24: 88-89. 1921.—The author gives an account of the mosses growing on wooded limestone ledges and cliffs at the base of Indian Rock, Monroe County, Pennsylvania. He mentions 17 species, all uncommon in the general region and some of much rarity, *Didymodon rubellus* (Hoffm.) B. & S. being definitely reported for the 1st time from the state.—*E. B. Chamberlain*.

3376. CONKLIN, GEORGE H. Report of the curator of the hepatic department for 1921. *Bryologist* 25: 23. 1922.—The following specimens, representing extensions of range, are listed among the additions to the herbarium of the Sullivant Moss Society: *Diplophyllum gymnostomophilum* from Wisconsin, *Lophozia obtusa* from British Columbia and Oregon, and *Neesiella rupestris* from California.—*A. W. Evans*.

3377. DISMIER, G. Localités nouvelles de Muscinées rares ou peu connues en France. [New localities in France for rare or little known bryophytes.] *Rev. Bryologique* 48: 49-52. 1921.—In this report, which is based largely on the author's own collections in various parts of France, 11 hepatics, 4 peat mosses and 34 true mosses are enumerated. The species are accompanied by full data regarding localities, several of which represent interesting extensions of range.—*A. W. Evans*.

3378. EVANS, ALEXANDER WILLIAM. Corsiniaceae, Targioniaceae, Sauteriaceae, Rebouliaceae, Marchantiaceae. *North Amer. Flora* 14: 29-66. 1923.—The author presents a taxonomic treatment of these families of the Marchantiales in accord with the other groups treated in this work. Keys are given for generic and specific identification, descriptions are included for the characterization of the families, genera and species, and synonyms, type locality, distribution, illustrations and exsiccata are cited for each species. The family Corsiniaceae is represented by 1 genus, *Corsinia*, with 1 species; Targioniaceae by 2 genera, *Targionia* and *Cyathodium*, with 1 species each; Sauteriaceae by 3 genera, *Clevea*, *Sauteria*, and *Peltolepis*, with 1 species each; Rebouliaceae by 5 genera, *Plagiochasma* (5 species), *Grimaldia* (4 species), *Cryptomitrium* (1 species), *Reboulia* (1 species), and *Asterella* (15 species); Marchantiaceae by 6 genera, *Lunularia* (1 species), *Conocephalum* (1 species), *Dumortiera* (2 species), *Bucegia* (1 species), *Preissia* (1 species), and *Marchantia* (5 species). No new species are characterized and no new combinations are made. This author is responsible for the ordinal description of the Marchantiales and the key to the 6 families. This precedes the treatment of the Ricciaceae [see *Bot. Absts.* 12, Entry 3383].—*E. B. Payson*.

3379. GRIER, N. M. The mosses of Washington County, Pennsylvania. *Bryologist* 25: 9-12. 1922.—This article includes a list, without annotations, of 123 species or varieties of mosses from Washington County in western Pennsylvania. This represents a revision of an earlier printed list by A. LINN and A. SIMONTON, with the addition of 13 species reported by JENNINGS. The revision was facilitated by the study of the original specimens, now in the possession of Washington and Jefferson College. A footnote gives a brief biographical notice of J. S. Simonton.—*E. B. Chamberlain*.

3380. GROUT, A. J. Mosses of a Staten Island house and lot. *Bryologist* 24: 64. 1921.—The author lists 20 mosses collected in a single day from a 87 x 150 ft. house lot on Staten Island, New York, and comments upon the absence from the island of arboreal mosses, although records of 25 years ago indicated their presence.—*E. B. Chamberlain*.

3381. HAYNES, CAROLINE COVENTRY, and MARSHALL AVERY HOWE. Sphaerocarpaceae, Riellaceae. *North Amer. Flora* 14: 2-8. 1923.—The authors present a taxonomic treatment of the order Sphaerocarpaceae and of the 2 families included under it, the Sphaerocarpaceae being represented by the genera *Sphaerocarpos* (with 4 species) and *Geothallus* (1 species) and the Riellaceae by the genus *Riella* (1 species). Keys are furnished for family, generic and specific discrimination. Descriptions are given for each category recognized; synonyms, type

locality, distribution, illustrations and standard exsiccati are cited. No new species or new combinations are included. The treatment of the order Sphaerocarpaceae is preceded by an unassigned characterization of the Division Bryophyta and the Class Hepaticae.—*E. B. Payson*.

3382. HENRY, R. *Le Lophozia Kunzeana* (Hüb.) Evans dans les Vosges et liste des muscinées recueillies au Honeck. [*Lophozia Kunzeana* in the Vosges Mountains and a list of the bryophytes collected at Honeck.] *Rev. Bryologique* 48: 60-62. 1921.—The discovery of *Lophozia Kunzeana* forma *plicata* at Honeck in the Vosges Mountains is announced, this being the 2nd French station for the species. The other bryophytes reported from the same general region include 15 mosses and 10 hepatics. Full data regarding localities are given under each.—*A. W. Evans*.

3383. HOWE, MARSHALL AVERY. *Ricciaceae*. *North Amer. Flora* 14: 11-27. 1923.—A taxonomic treatment of the family Ricciaceae of the Marchantiales is presented by the author. This contains descriptions of the family; of the 3 genera, *Riccia*, *Ricciocarpus* and *Oxymitra*; and of their species, *Riccia* being represented by 25 and the other 2 genera by 1 apiece. Synonyms, type locality, distribution, illustrations and exsiccati are cited for each species. No new species are described and no new combinations are made.—*E. B. Payson*.

3384. INGHAM, W. *Georgian mosses*. *Rev. Bryologique* 48: 43. 1921.—Under the above title 14 mosses from British Columbia are listed, no more definite data regarding localities being given. The list was based on collections made by A. Brinkman.—*A. W. Evans*.

3385. POTIER DE LA VARDE, R. *Musci madurenses* (contribution à la flore bryologique de l'Inde méridionale). [*Mosses of Madura* (contribution to the moss flora of southern India).] *Rev. Bryologique* 49: 33-44. 13 fig. 1922.—The present report is based primarily on a collection of mosses bearing the title, "*Musci madurenses* Indiae meridionalis exsiccati," and distributed by Foreau, with the collaboration of André, Roiné and Vellé, all of whom are missionaries in the district of Madura in southern India. The specimens were first studied by Cardot, and the new species were distributed under his manuscript names. Since there was no immediate prospect that these new species would be published by their author, Potier de la Varde has, with the sanction of Cardot, prepared an account of the entire collection, the new species appearing under their joint authorship. In this first installment of the work, 23 species are enumerated, with full data regarding stations and collectors and usually with critical remarks. The following are proposed as new: *Campylopus Andreanus*, *C. Roinei*, *Dicranella denticulata*, *D. stricticaulis*, *Dicranum dilatinerve*, *Hyophila validinervis*, *H. viridula*, *Syrrophodon calymperoides*, *S. leucophanoides*, *Thysanomitrium Depallieri*, *T. Foreanum*, *T. leioneuron*, and *Weisia macrospora*. All the new species are illustrated.—*A. W. Evans*.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 2978, 3414, 3435, 3436, 3437, 3465, 3496, 3497, 3509, 3519, 3552)

FUNGI

3386. ANONYMOUS. *Pathological herbarium notes* 5. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections. 7 p. 1922.—In this number the 2386 accessions to the herbarium added between April 1 to November 1, 1922, are listed.—*H. M. Fitzpatrick*.

3387. ARTHUR, JOSEPH CHARLES. (*Uredinales*) *Aecidiaceae*. *North Amer. Flora* 7: 481-540, 541-604. 1922.—The author with his collaborators continues his treatment of the North American rusts. Keys to the species of each genus are included. Each species is charac-

terized by the citation of synonyms, a specific description, citation of host plants, type locality, distribution, illustrations, and standard exsiccati. The treatment of the genus *Klebahnia*, continued from the previous part, is completed. *Bullaria* with 66 species is treated in collaboration with EDWIN BUTTERWORTH MAINS. Forty-seven of these species are new combinations in the genus. *Teleutospora* with 11 species is offered in collaboration with GUY RICHARD BISBY. Eight new specific combinations are made. *Micropuccinia* with 149 species and 86 new specific combinations is published in collaboration with HERBERT SPENCER JACKSON. A key is given to the form genera *Uromyces* (10 species), *Puccinia* (43 species), *Uredo*, *Aecidium*, *Peridermium*, and *Caeoma*. No new species are characterized or new combinations made in these form genera.—E. B. Payson.

3388. BULLER, A. H. R. *Researches on fungi. Vol. II. Further investigations upon the production and liberation of spores in Hymenomycetes xii + 492 p., 157 fig.* Longmans, Green and Co.: London, 1922.—A comparison of the basidium of the Hymenomycetes with that of the Gastromycetes shows that the former is to be regarded as a much specialized organ for spore discharge. In all the Hymenomycetes studied the discharge of the spore from the basidium is preceded by the exudation of a small droplet of fluid substance from the hilum and followed soon by the collapse of the basidium. In the development of the spore a longer time is required for those having thick, pigmented or sculptured walls. After attaining their full size spores take still longer to ripen. Abnormal or sterile fruit-bodies are often caused by parasites or unknown agencies. Changes in condition may greatly affect size of fruit-bodies of *Coprinus lagopus*. *Marasmius oreades* may be successfully cultivated for food. *Hydnum septentrionale* probably liberates its spores in a constant stream, as do the Hymenomycetes in general. In the autumn *Fomes fomentarius* develops its new annual tube layer and the spores are liberated the following spring; each annual layer may produce spores 4 years in succession. This species shows a striking adaptation in its response to the action of gravity. *Fomes applanatus* attacks upwards of 50 species of trees, liberates about 30 billion spores in 24 hours and has a spore-fall period of over 6 months (the longest known). In the Hymenomycetes in general the most watery fruit-bodies have the shortest spore-fall period. In order to maintain themselves it is necessary for wood-destroying fungi to produce vast numbers of spores. In the Hydnaceae, Tremellaceae and Clavariaceae the form of the fruit body is intimately correlated with the size and spore-discharging power of the basidia. *Dacryomyces deliquescens* has oidial and basidial fruit-bodies which have been regarded by some as different species. The galls formed by *Exobasidium* enable the parasite to extend its hymenial surface. The red squirrel of North America collects fleshy fungi in autumn, stores them in dry places and eats them during the winter. Slugs feed upon most species of fleshy fungi growing in woods, even poisonous species being eaten. The slug uses its sense of smell in locating fungi. The Agaricineae are divided into two types, based on the organization of the hymenium, (1) the Aequi-hymeniiferae or Non-Coprinus type and (2) the Inaequi-hymeniiferae or Coprinus type. In the *Panaeolus* sub-type, of which *Panaeolus campanulatus* is taken as an example, the gills are mottled, and each area is found to give rise to successive generations of basidia which ripen their spores and then collapse. The areas are thus constantly changing. The author has figured the hymenium during several stages, giving a complete and detailed analysis of the elements and their behavior. The same is done for *Stropharia semiglobata*, *Anellaria separata* and *Psalliota (Agaricus) campestris*. A very detailed account of the morphology and biology of the last named species is given, and the hymenium is figured and minutely described. *Secotium agaricoides* resembles a puff-ball but is closely related to *Psalliota*.—D. S. Welch.

3389. BÜREN, GÜNTHER VON. *Weitere Untersuchungen über die Entwicklungsgeschichte und Biologie der Protomycetaceen.* [Further investigations of the development and biology of the Protomycetaceae.] Beitr. Kryptogamenflora Schweiz 5: 1-94. Pl. 1-2 (1 colored), fig. 1-27. 1922.—The long continued investigations on which this paper was based constitute a detailed cultural and morphological study of the species of the Protomycetaceae. Cross inoculations on a wide range of host plants show that *Protomyces macrosporus* Unger is represented by at least seven distinct races or biologic species as follows: f. spp. *Aegopodii*, *Heraclei*,

Chaerophylli, *Chaerefolii*, *Carvi*, *Ligustici*, and *Laserpitii*. The species is confined in its parasitism to the Umbelliferae but the various strains possess a relatively wide host range. Another species, *P. inundatus* Dang., is confined to a single host species, *Apium nodiflorum*. Several species of *Protomyces* occur on members of the Compositae. In addition to *P. pachydermus* Thüm. on *Taraxacum officinale* and *P. Kreuthensis* Kühn on *Aposeris foetida*, four new species are described and figured by the author; *P. Kriegerianus* on *Leontodon*, *P. Picridis* on *Picris*, and *P. Crepidicola* and *P. paludosae* on *Crepis*. In *Protomyces* and *Protomycopsis* the spores develop in the elongated endospore, and in *Protomyces* they copulate in pairs at maturity. In *Volkartia* they develop in the chlamydospore before the elongation of the endospore. In the genus *Taphridium*, also included in this family, the endospore fails to elongate. These points furnish the bases for generic separation. The author describes as new, *Protomycopsis Leucanthemi* Magnus and *P. Arnoldii* Magnus on *Chrysanthemum* and *Leontodon*, respectively, *P. Chrysanthemi* on *Chrysanthemum alpinum* and *P. Leontodontis* on *Leontodon autumnalis*. In the genus *Volkartia*, the species *V. umbelliferarum* (Rostr.) v. Büren and *V. rhaetica* Maire are discussed. A colored plate pictures the characteristic lesions produced on the host by various species. The copulation of spores in *Protomyces* is illustrated, the spores being shown as uninucleate and nuclear fusion following cell fusion.—H. M. Fitzpatrick.

3390. FONTOYNONT, M., et P. SALVAT. Sur une Actinomycose du Rat à Madagascar. [An actinomycosis of the rat in Madagascar.] Bull. Soc. Path. Exotique 15: 596-607. Fig. 1. 1922.—The *Actinomyces* concurrently described by Langeron [Bot. Absts. 12, Entry 3393] is here treated at length. The symptoms are described in detail and a discussion of the parasite in the host and in pure culture is given. The best growth was secured in peptone glycerin gelatin with the addition of 4 per cent glucose or maltose, and in coagulated serum; in various vegetable glycerin media (potato, carrot, and turnip) less abundant growth was secured. Inoculation experiments were performed on rabbits, guinea-pigs, and rats.—G. H. Godfrey.

3391. JUEL, H. O. Cytologische Pilzstudien. II. Zur Kenntnis einiger Hemiasceen. [Cytological studies in the fungi. II. Concerning some Hemiascaceae.] Nov. Act. Reg. Soc. Sci. Upsal. Ser. 4, 5: 1-43. Pl. 1-2, fig. 1-4. 1921.—The nuclear divisions in *Endomyces decipiens* are shown to be mitotic, not amitotic as described by other authors for related forms and apparently the reduction division occurs in the ascus. In the author's previous studies on *Dipodascus albidus* no mitotic figures were seen. Reexamination of his preparations has resulted in the discovery of a fusion nucleus in spireme, and another showing the telophase of the first division. Both are figured. It is called to attention that von Büren has separated the species of *Taphridium* into two groups including in the genus *Volkartia* Maire (emend.), *V. umbelliferarum* and *V. rhaetica*, while retaining *T. algeriense* in *Taphridium*. No adverse comment is made on the recognition of two genera, but it is pointed out that *T. umbelliferarum* is the type species of *Taphridium*. Therefore as *V. rhaetica* Maire is congeneric with it *Volkartia* is a synonym for *Taphridium*, and a new genus name is necessary for the species *T. algeriense*. In *T. umbelliferarum* as in other members of the Protomycetaceae the spores are formed in a peripheral layer. Two nuclear divisions were seen to take place and it is thought that a third follows. Conjugate divisions apparently take place in the vegetative cells of the species of *Taphrina* investigated. In the asci of most of the species 3 typical mitoses occur. In *T. aurea* these divisions may be amitotic. In this species and in *T. carnea*, only one of the eight nuclei is incorporated in a spore. The ascogenous cell of *Taphrina* may be considered a chlamydospore which soon germinates, the endospore growing out into an ascus. The *Endomyces* type may have arisen from the *Dipodascus* type by a reduction in the number of nuclei. In like manner the *Taphrina* type may be derived from the type present in the Protomycetaceae.—D. S. Welch.

3392. KILLIAN, CH. Le développement du Stigmatia Robertiani Fries. [The development of Stigmatia Robertiani Fries.] Rev. Gén. Bot. 34: 577-588. Pl. 14-17, fig. 1. 1922.—The fruit-bodies of this fungus are found on the surface of the leaves of *Geranium Robertianum*. The fungus is confined to the surface of the epidermal layer and there is no appreciable injury to the neighboring cells. No conidial fructification has been observed. There is a thickening

of the layer of hyphae in certain places to form carpophores and within these, archicarps are formed which quickly become ascogonia, there being one in each carpophore. An antheridium develops from a neighboring cell and fertilization takes place. Ascogenous hyphae develop bearing ascus hooks. They are very short and do not branch. In the simplicity of its sexual apparatus *Stigmatea* resembles the Erysiphaceae. A remarkable similarity is also seen when this form is compared with *Dothidella Ulmi* and *Cryptomyces Pteridis*. The lack of conidia in *S. Robertiani* is compensated for by the abundant development of ascogenous tissue. The leaves of the host remain alive all winter and conditions are favorable for continuous growth. Since there is abundant and continued growth of carpophores a complicated system of ascogenous hyphae is not necessary for a continuous production of asci and spores.—*D. S. Welch*.

3393. LANGERON, MAURICE. *Actinomyces Salvati* n. sp. nouveau *Microsiphoné malgache*. [A new microsiphon from Madagascar.] Bull. Soc. Path. Exotique 15: 526-528. 1922.—Salvat, Director of the Pasteur Institute of Tananarive in 1910, obtained cultures of a microsiphon from lesions in a rat [Bot. Absts. 12, Entry 3390.] These were submitted to Langeron for identification who describes it as a new species *Actinomyces Salvati*. Langeron agrees with Breed and Conn that *Actinomyces* Meyen, 1828, and *Actinomyces* Harz, 1877, are not synonymous, and places this organism in the genus *Actinomyces*.—*G. H. Godfrey*.

3394. LANGERON, MAURICE. Sur un champignon d'une otomycose brésilienne: *Sterigmatocystis Hortai* n. sp. [A fungus associated with a case of ear mycosis in Brazil.] Bull. Soc. Path. Exotique 15: 383-384. Fig. 1. 1922.—The fungus found in connection with a case of ear mycosis in Brazil was entrusted to the author for identification. It was found to be a *Sterigmatocystis*, the organism being found in a bit of the dried membrane found in the ear of the patient and in pure cultures derived from this source. The name *Sterigmatocystis Hortai* is proposed and a description given.—*G. H. Godfrey*.

3395. LANGERON, MAURICE, et P. HORTA. Note complémentaire sur le *Cladosporium Wernecki* Horta, 1921. [Complementary note on *Cladosporium Wernecki* Horta.] Bull. Soc. Path. Exotique 15: 381-383. Fig. 1. 1922.—A full description of an organism producing lesions on a patient in Brazil, the symptoms of which were described in a previous paper. The fungus shows a remarkable polymorphism. On glucose or maltose gelatine a Fumago-form appears, with roundish minutely porose elements, thick walls, sometimes distinctly colored; on carrot, a Dematium-form appears, with mycelium formed of short elements which give rise to blastospores, simple or septate, which themselves may bud. It results in the production of innumerable yeast-like forms, which give the culture a moist shiny appearance. Finally in carrot bouillon there appears a delicate mycelium which gives rise to a large quantity of conidia of the *Cladosporium* type. This polymorphism agrees with the findings of other workers in connection with organisms from similar sources, and confirms the authors in their determination of the fungus as a *Cladosporium*.—*G. H. Godfrey*.

3396. LEGER, MARCEL, et MAURICE NOGUE. Mycose à *Scopulariopsis* chez deux malades ayant des lésions cutanées rapellant la lèpre. [Mycosis due to *Scopulariopsis* in the case of two patients having cutaneous lesions resembling leprosy.] Bull. Soc. Path. Exotique 15: 654-661. Fig. 1-3. 1922.—Two patients at the hospital at Dakar showed symptoms of dermatosis which were clinically similar, and which developed the same fungus when cultured. The fungus is classified with the Fungi Imperfecti, family Conidioporeae, sub-family Sporophoreae, after the classification of Vuillemin. It differs from Vuillemin's *Acremonium potronii*, and also from Castellani's *Scedosporium*, found in cases of mycosis. The writer considers that he is dealing with a *Scopulariopsis*, his species being different from several described by Brumpt. He proposes the name *Scopulariopsis leproides* and gives cultural and morphological descriptions, clinical observations and treatment.—*G. H. Godfrey*.

3397. LEVINE, MICHAEL. The origin and development of lamellae in *Agaricus campestris* and in certain species of *Coprinus*. Amer. Jour. Bot. 9: 509-533. 2 pl., 25 fig., 12 text diagr. 1922.—Previous work on the development of the Basidiomycetes is discussed at some length.

Agaricus campestris var. *Bohemia* and var. *Columbia* (?); *Coprinus ephemerus* and *C. stercorarius* were studied. The first species was grown in a mushroom cellar, the last two on agar. Material was studied both in the fresh condition and after fixation in a variety of killing fluids. The development of all 3 species was found to be similar in general to that previously described by the author for *Coprinus micaceus*. Certain conflicting results reported by other workers are thought to be due to shrinkage and consequent tearing of the tissue produced by the fixing agent. No primary annular gill cavity was found in any of the species. The primordium of the hymenium arises as pockets of palisade cells which increase in number and form small arches. The interhyphal spaces enclosed between them are the beginnings of the gill cavities. The vertical plate of hyphae between the two arches is the rudimentary trama. The palisade cells forming the vertical walls of the arch are the rudiments of the adjacent hymenia of 2 gills. Secondary or short gills arise in a similar manner, from new pockets of palisade cells intercalated at the margin of the pileus. The short gills are attached to the stipe fundament from the beginning and do not grow downward between two old gills.—E. W. Sinnott.

3398. NANNIZZI, ARTURO. Sulla forma ascofora dell'*Oidium quercinum* Thüm. [On the ascospore form of the *Oidium quercinum* Thüm.] Riv. Patol. Veg. 12: 87-90. 1922.—Perithecia of *Microsphaera quercina* (Schw.) Burr. were found on *Quercus sessiliflora* and *Q. pedunculata* under conditions which seem to offer confirmation to the hypothesis of Peglion that they develop during periods of cool weather following prolonged warm weather.—F. M. Blodgett.

3399. ОТА, М. Sur deux especes nouvelles de Dermatophytes en Mandchourie: *Microsporum ferrugineum* et *Trichophyton pedis* n. sp. [Two new species of dermatophytes in Manchuria.] Bull. Soc. Path. Exotique 15: 588-596. Fig. 1-4. 1922.—(1) A skin disease due to *Microsporum ferrugineum* is very common in Manchuria, especially among children, causing infantile baldness and a disease of the smooth skin. On the scalp it causes scaly spots which vary from 1 to several cm. in diameter and from which the hair pulls out easily. Microscopic examination of the roots of hairs from diseased spots show the presence of mycelial elements upon the surface and within the bulb. Abundant mycelium is also found within the scales. The organism is very similar to *Microsporum equinum* and *M. flavescens* but differs morphologically. Inoculations on guinea pigs were negative.—(2) In four cases of "dyshydrose" of the foot, *Trichophyton pedis* n. sp. was found. It resembles *T. niveum*, but its cultural characteristics are very different. Two types were observed, one brownish and the other violaceous in color, distinguished as *Trichophyton a* and *Trichophyton b*. The differences between the genera *Trichophyton* and *Epidermophyton* are solely clinical, there being no distinct botanical differences. It also resembles *Trichophyton ectothrix*.—G. H. Godfrey.

3400. PARKS, HAROLD E. The genus *Neotoma* in the Santa Cruz mountains Jour. Mammalogy 3: 241-253. 1922.—Along with notes on the habits of the wood rat, interesting information is given regarding the use of various species of Hymenogastraceae for food. The holes which the rat makes to get these fungi offer a very good means of locating the fructifications, as only the fully ripe, galatinizing ones are sought by the rats.—C. H. Dodge.

3401. PETCH, T. Additions to Ceylon fungi. II. Ann. Roy. Bot. Gard. Peradeniya 7: 279-322. 1922.—This paper contains the descriptions of the following new species: *Clitocybe sordida*, *Omphalia straminea*, *Hygrophorus diversicolor*, *H. mutabilis*, *H. similis*, *Russula fusco-grisea*, *Cantharellus decurrens*, *Phlebophora hyalina*, *Claudopus repens*, *Pluteus flavomarginatus*, *Pholiota badia*, *Boletus xylophilus*, *B. sylvestris*, *Polyporus inornatus*, *Fomes imitator*, *Poria endoxantha*, *P. rubescens*, *P. albocitrina*, *P. sulphurea*, *Hydnum fragile*, *H. nigrescens*, *Corticium hypochroum*, *Kordyana commelinae*, *Porothelium reticulatum*, *Cyphella flagellata*, *C. grisea*, *Dendrocypella* (gen. nov.) *setosa*, *Clavaria xylarioides*, *C. rosolana*, *C. violacea*, *Pistillaria actiniceps*, *Uromyces anotidis*, *Blastophora hedyotidis*, *Phragmidium zeylanicum*, *Uredo hyperici-japonici*, *U. meliosmae*, *U. cassiae-bicapsularis*, *U. argyreiae*, *U. phyllanthi-reticulati*, *U. cudraniae*, *U. marisci*, *U. caricicola*, *U. panici-villosi*, *U. dendrocalami*, *U. lophatheri*, *Eurotium orientale*, *Zukalia rubi*, *Zukaliopsis heveae*, *Physalospora cyperi*, *Trichosphaeria*

sparsibarba, *Desmotascus cocoes*, *Rosellinia albocincta*, *Sordaria citrina*, *S. pilosa*, *S. byssiseda*, *Sphaerella mappiae*, *S. vernoniae*, *S. senecionis*, *S. lobeliae*, *Bertia turbinata*, *B. tessellata*, *Massarina biconica*, *Lentomitia ovalis*, *Eutypa conjuncta*, *Peroneutypa variabilis*, *Melanconiella stellata*, *Thyridaria pteridis*, *Oligostroma strychni*, *Phaeodothis isachnes*, *Cladothyrium reticulatum*, *Micropetella confluens*, *Amazonia peregrina*, **Phaeoglossum** (gen. nov.) *zeylanicum*, *Phyllosticta mayilae*, *Phoma durionis*, *P. justiciae*, *P. aterrima*, *Phomopsis phaseoli*, *P. cocoes*, *Cytospora discoidea*, *Ascochyta lobeliae*, *A. cyphomandrae*, *Hendersonia obesa*, *H. rosicola*, *H. heveae*, *Asterostomella aberiae*, *Phacodiscula cudraniae*, *Gloeosporium litseae*, *G. impatientis*, *G. cryptum*, *Colletotrichum paucisetum*, *Septogloeum dumasiae*, *Acremonium roseum*, *Verticillium niveum*, *Trichothecium parasiticum*, *Monacrosporium ovatum*, *Trichocladium olivaceum*, *Septonema exaltatum*, *S. hormiscioides*, *Heterosporium wikstroemiae*, *Helminthosporium extensum*, *H. ampullaceum*, *Tubercularia nigro-maculans*, and *Tubercularia viridis*. Numerous other previously described species are recorded from Ceylon.—*E. D. Merrill*.

3402. PETCH, T. **Interim notes on entomogenous fungi.** *Ann. Roy. Bot. Gard. Peradeniya* 7: 323-327. 1922.—This paper consists of the original description of *Torrubiella tenuis* from Ceylon, *T. sublineata* from Chili, *T. barda* from Chili, and *Aschersonia intermedia* from Chili.—*E. D. Merrill*.

3403. PETCH, T. **Studies in entomogenous Fungi. II. The genera Hypocrella and Aschersonia.** *Ann. Roy. Bot. Gard. Peradeniya* 7: 167-278. Pl. 2-7. 1921.—A general monographic treatment of the known species in the two genera named, with keys, descriptions, geographic distribution, etc. Twenty-nine species of *Hypocrella* and thirteen of *Aschersonia* are fully described and discussed. Four others of the first genus and three of the last are indicated as not having been seen by the author. Three species of *Hypocrella* are considered as doubtful, while about twenty-four species placed by various authors in the two genera are excluded. The following new names appear: *Hypocrella olivacea* Petch, *H. ceramichroa* Petch (*Hypozygon* Berk. & Br.), *H. nectrioides* Thaxter, *H. oxystoma* Petch (*Hypocrea* B. & C.), *H. tubulata* Petch, *H. andropogonis* Petch (*Aschersonia* P. Henn.), *Aschersonia brunnea* Petch, *A. flava* Petch, *A. colomnifera* Petch, and *A. acutispora* Petch.—*E. D. Merrill*.

3404. RAYNAUD, M., J. MONTELLIER, et A. LACROIX. **Un case de mycétome de pied à Nocardia madurae, chez un indigène algérien.** [A case of mycetoma of the foot in an Algerian native.] *Bull. Soc. Path. Exotique* 15: 379-381. 1922.—The authors report another case of mycetoma, the sixth observed in Algeria. The clinical history of the case is given in some detail. Attempts to culture the organism were at first unsuccessful, even on the most diverse culture media. Finally cultures were obtained in tubes of Sabouraud glucose gelatine containing blood, incubated at 27°C. Growth occurred after fifteen days. Transfers to tubes of the same medium gave typical reddish cultures of *Nocardia madurae*.—*G. H. Godfrey*.

3405. REICHENSBERGER, A. **Neue eigenartige Parasiten von Termiten.** [A peculiar new parasite of Termites.] *Soc. Fribourgeoise Sci. Nat. Bull.* 26. (1-12 of separate.) 1922.—The author describes *Termitaria Thaxteri* n. sp. on *Eutermes Ripperti*, *E. arenarius* and *Cornitermes cumulans*, and discusses other species of *Termitaria*.—*C. W. Dodge*.

BACTERIA

3406. LIPMAN, JACOB G., and SELMAN A. WAKSMAN. **The oxidation of selenium by a new group of autotrophic microorganisms.** *Science* 57: 60. 1923.—This is a preliminary announcement of the finding of a new autotrophic form of bacteria. It is a minute, rod-shaped bacterium, capable of obtaining its energy only from the oxidation of selenium to selenic acid.—*C. J. Lyon*.

3407. MILLER, E. C. L., and G. F. REDDISH. **Specific terms for the proteolytic activity of anaerobes.** *Science* 57: 23-24. 1923.—It is proposed to qualify the term "proteolytic" by such specific terms as sarcolytic (dissolution of flesh), peptolytic (dissolution of peptone), gelatinolytic (dissolution of gelatin), etc., in the interests of greater accuracy.—*C. J. Lyon*.

3408. OLITSKY, PETER K., and FREDERICK L. GATES. *Investigations on the bacteriology of epidemic influenza*. Science 57: 159-166. 1923.—The investigations have resulted in the isolation, from the naso-pharyngeal secretions of influenza patients, of a new organism, *Bacterium pneumosintes*. This organism is filterable, anaerobic and pathogenic for rabbits, producing infection comparable to influenza in man. Animals injected with living or killed organisms are thereafter immune. Subcutaneous injections of killed cultures into men induced the formation of specific antibodies. The blood serum of recovered influenza patients contains agglutinins for the isolated organism but that of normal persons does not. It seems reasonable, though not at this time desirable, to claim this organism to be the cause of epidemic influenza.—C. J. Lyon.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 2986, 2990, 3339, 3365, 3581)

3409. BERRY, EDWARD W. *Tertiary plants from the Andes of Cajamarca, Peru*. Amer. Jour. Sci. 5: 239-246. Fig. 1-6. 1923. The author describes the new species *Goniopteris Bravoi*, *Filicites peruanus*, and *Myrcia cajamarcana*, late Tertiary plants, from tuffs exposed near Jadibamba in the Department of Cajamarca in northern Peru. These indicate considerable uplift since they were fossilized.—E. W. Berry.

3410. BERRY, EDWARD W. *Sagenopteris, a Mesozoic representative of the Hydropteraceae*. Bot. Gaz. 74: 329-331. Fig. 1. 1922.—The author reports the occurrence of Marsilia-like sporocarps in the lower part of the Blairmore formation of western Canada. The name *S. canadensis* is given to the material, although the writer suggests that these sporocarps doubtless belong to the widely distributed *S. elliptica* Fontaine. This material, the author believes, confirms his earlier opinion that *Sagenopteris* is related to the recent Hydropteraceae.—B. W. Wells.

3411. CARPENTIER, A. *Revue des travaux de paléontologie végétale publiés dans le cours des années 1910-1919. 1^{re} Partie: Paléozoïque. (Suite.)* [Review of the works in vegetable paleontology published during the years 1910-1919. Pt. I. Paleozoic. Rev. Gén. Bot. 33: 437-448, 471-477, 558-576, 653-672, 771-791. 1921. 34: 65-70, 124-133, 166-170, 237-250, 300-310, 367-375, 417-424, 463-470, 508-518, 556-563, 604-611. 1922.

3412. CHAPMAN, F. *On a fossil filamentous alga and sponge-spicules forming opal nodules at Richmond River, N. S. W.* Proc. Roy. Soc. Victoria 34: (N. S.): 167-171. Fig. 1-2. 1922.—Microscopical examination of sections of common opal from the diatomaceous deposits of the Richmond River at Tintenbar, New South Wales, disclosed a spicule-rock originating from fresh-water sponges and the matted thalli of a confervoid fresh water alga now silicified. This rare form is described and named *Cladophora richmondiensis*. It is attributed to the late Cenozoic, probably Pleistocene. The spicule-rock contained spicules of the *Spongilla* type. A very few traces of amphidiscs of the *Spongilla capewelli* type were seen. A few appear to resemble *Meyenia*, including a portion of what appeared to be the head of a birotulate spicule with a denticulate margin resembling *Meyenia ramsayi*.—Eloise Gerry.

3413. CHANEY, R. W. *A fossil flora from the Puente formation of the Monterey group*. Amer. Jour. Sci. 2: 90-92. 1921 [see Bot. Absts. 10, Entry 1264].—This formation is from the lower or middle portion of the Miocene of southern California. The previously known flora was made up of marine algae. Recent collections contain forms referable to the modern genera of marine algae, *Desmerestia* and *Lessonia*, and the following 16 forms referable to vascular land plants of moist situations: *Aralia whitneyi*, *Bumelia florissanti* (?), *Crataegus* (?) sp., *Fagopsis longifolia*, *Ficus arenaceae formis*, *Ficus* cf. *purpureaensis*, *Fraxinus mespilifolia*, *Fraxinus ungeri* (?), *Laurus saliciformis*, *Nelumbo* (?), *Planera myricaefolia*, *Populus crassa*, *Salix* n. sp., *Sapindus* n. sp., *Sterculea* cf. *engleri*, and *Zizyphus piperoides* (?).—T. J. Fitzpatrick.

3414. EDWARDS, W. N. An Eocene microthyriaceous fungus from Mull, Scotland. Trans. British Mycol. Soc. 8: 66-72. Pl. 8. 1922.—The author describes *Phragmothyrites eocaenica* from coniferous leaves found in the Eocene of Mull, and considers it to be related to the existing genus *Phragmothyrium* von Höhnelt.—E. W. Berry.

3415. FENNEMAN, NEVIN M. Recent work in paleobotany. Science 57: 44-45. 1923.—The report of the Committee on Paleobotany of the Division of Geology and Geography of the National Research Council for 1921-1922 calls attention to the extended application of microscopic study of carbonaceous deposits and its practical bearing on the coal and oil industries, to the increase in instruction in paleobotany in the past year in two; and to the comparatively uncultivated field of microchemistry of plant residues.—C. J. Lyon.

3416. KERNER MARILAUN, FRITZ. Bauxite und Braunkohlen als Wertmesser der Tertiärklimate in Dalmatien. [Bauxite and wood coal as an indicator of tertiary climate in Dalmatia.] Sitzungsber. Akad. Wiss. Wien [Math.-nat. Kl.] Abt. 1, 130: 35-70. 1921 [1922].—A technically geological and meteorological presentation of the evidence as to the character of the early Tertiary climate in southern Europe afforded by the plant remains in alluvial deposit in Dalmatia. This part of Europe was at that time an archipelago, in which at various distances from the sea the climatic and floral features of seacoast, coastal plain and forest were found. First emerging from the sea in Paleocene times, it was submerged again in early Eocene, becoming a littoral region, then a mountainous coast in late Eocene; and finally a tidal flood plain and delta region in Oligocene.—The coal-containing deposits are from early Oligocene and Pliocene.—F. Weiss.

3417. KOZŁOWSKI, ANIELA. Sur les céréales fossiles néolithiques en Pologne. [Fossil cereals from the neolithic period in Poland.] Bull. Acad. Polonaise des Sci. et Lettres Cl. Math. Nat. Ser. B. Sci. Nat. 1920: 7-14. 1920.—This paper considers the first discoveries of neolithic cultivated cereals in Poland. From the caves of Ojców near Krakow and from loess layers in Złota near Sandomierz in connection with neolithic culture, the following species of wheat and rye were found: *Triticum monococcum*, *T. compactum*, *T. vulgare*, *T. Spelta*, *T. dicoccum* and *Secale cereale*. Of the wheat, the most interesting is *T. Spelta*, found for the first time in the neolithic period in Europe. Because *T. Spelta* was found together with *T. compactum* and *T. vulgare* (the last appearing in different forms), it is probable that at that time it was a natural cross. *Secale cereale* was also found for the first time in the neolithic period. Up to the time of this research it had been known only from the Bronze Age.—Aniela Kozłowska.

3418. KRYSHTOPOVICH, A. Pleuromeia and Hausmannia in Eastern Siberia, with a summary of recent contributions to the paleobotany of the region. Amer. Jour. Sci. 5: 200-208. Fig. 1-7. 1923.—This paper records stems and sporophylls of *Pleuromeia sternbergii* (Münster) Corda, an older Mesozoic survival of the Paleozoic Lepidophyta from the Triassic of Cape Jitkoff near Vladivostok in eastern Siberia. This species has been hitherto known only from the Bunter or lower Trias of central Europe. The author describes the well marked new species, *Hausmannia ussuriensis* of the lower Jurassic (tentatively referred to the Lias) from the western shore of Amur gulf near Vladivostok. In addition the author reviews recent, mostly inaccessible, contributions to the paleobotany of the region and lists both Jurassic and Permian plants from this district.—E. W. Berry.

3419. SCOTT, D. H. The early history of the land flora. Nature 110: 606-607, 638-640. 1922.—“Early history” is used to cover the Devonian and Lower Carboniferous periods, various plants of which are briefly discussed.—The morphology and probable relationships of *Rhynia*, *Hornea* and *Asteroxylon* are discussed. The discovery of these has quite changed our knowledge of early Devonian plants. The chief conclusion reached is that the main phyla are distinct.—O. A. Stevens.

3420. WALKOM, A. B. On the occurrence of Ototamites in Australia, with descriptions of specimens from Western Australia. Proc. Linn. Soc. New South Wales 46: 147-153. 1 pl. 1921.—A collection of *Ototamites* was examined from 3 miles north of the Mingenew Railway

Station (W. A.) at an altitude of 627 feet. The specimens were found in a ferruginous sandstone lying almost horizontally and little known stratigraphically. There were about 70 feet of sandstone associated with marine beds of Jurassic age below the plant-bearing bed. It is doubtful whether these were above or below the sandstone. Three species of *Otozamites* which were recognized are discussed: *O. Bechei*, *O. Feistmantli* and *O. bengalensis*. In addition there were coniferous fragments, *Pagiophyllum* (?) sp. and *Elatocladus* (?) sp., a doubtful cone, and indeterminate fragments of wood. The occurrence of *Otozamites* throughout Australia is discussed, and their significance with reference to early climatic conditions as indicated by the flora of the "red beds" is suggested.—*Eloise Gerry*.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 2917, 2927, 2940, 2941, 2963, 2978, 3105, 3118, 3124, 3126, 3140, 3170, 3180, 3207, 3212, 3254, 3258, 3270, 3284, 3288, 3306, 3313, 3314, 3354, 3386, 3387, 3389, 3390, 3393, 3394, 3395, 3396, 3399, 3404, 3408, 3414, 3493, 3555, 3558, 3565, 3567, 3568, 3641, 3642, 3643)

DISEASES CAUSED BY FUNGI

3421. ANONYMOUS. Downy mildew in South Australia. Jour. Dept. Agric. Victoria 19: 499. 1921.—This is a brief note on the occurrence of the disease.—*F. V. Rand*.

3422. BEVAN, W. *Peronospora* campaign 1922. Cyprus Agric. Jour. 17: 84-85. 1922.—An account is given of five demonstrational spraying experiments undertaken by the Cyprus Department of Agriculture for the control of *Peronospora*. Three methods of treatment were tried in each vineyard. One lot of vines was sprayed with Bordeaux mixture; another, with Antiperonosporini; and the third with Solomia, claimed to be a new fungicide and insecticide non-poisonous and harmless to vegetation. On the first two plots sulphur was applied as a preventive of *Oidium*, but none was used on the Solomia plot. Three, and in some cases, four applications of spray materials were made during the season. Owing to dry weather unsprayed vines showed but little injury from *Peronospora* or *Oidium*, hence the results secured were not as marked as they otherwise would have been. Nevertheless the general appearance of the sprayed vines was superior to that of the unsprayed and no *Peronospora* infection was noted.—*W. Stuart*.

3423. BISBY, G. R., J. F. HIGHAM, and H. GROH. Potato seed treatment tests in Manitoba. Sci. Agric. 3: 219-221. 1923.—Seed treatment for *Rhizoctonia* is apparently of little value in Manitoba, but early digging tends to reduce the number of sclerotia on the progeny. Treatment of tubers with formalin and corrosive sublimate checked black scurf and increased the yield. Copper sulphate is neither dependable nor safe.—*T. G. Major*.

3424. BRITTLEBANK, C. C. Seed-borne diseases. "Take All," *Ophiobolus graminis*, Sacc.: "Flag Smut," *Urocystis tritici* Koern. Jour. Dept. Agric. Victoria 19: 447. 1921.—This is a brief account of the first appearance of "flag smut" and "take all" in the United States.—*Lillian C. Cash*.

3425. COLE, C. F. A new citrus disease. (*Pythiacystis citrophthora*.) Jour. Dept. Agric. Victoria 19: 363-366. 1921.—This is a notice of the first appearance of this disease in Victoria. A description of the effects of the disease and methods of treatment are given.—*Wm. E. Lawrence*.

3426. CUNNINGHAM, G. H. The second hand fruit-case as a source of fungous-disease infection. New Zealand Jour. Agric. 24: 241-243. 1922.—Infection was readily secured by inoculations with material of the brown rot fungus (*Sclerotinia cinerea* Schroet.) from fruit-cases a month after they had contained diseased fruits. All old cases should be carefully disinfected.—*N. J. Giddings*.

3427. DORAN, WM. L. **Effect of external and internal factors on the germination of fungous spores.** Bull. Torrey Bot. Club 49: 313-340. Fig. 1-2. 1922.—The germination of spores of several different types and of seven species of fungi was studied. For parasitic fungi, germination was better when the spores were obtained from the living host rather than from artificial media. The more mature the spore, the more easily it can be germinated. A study of longevity of spores showed that viability decreased rapidly with age, the rate of such decrease depending partly on storage conditions. Temperature relations are such that spores of Phycomycetes can germinate at the lowest minimum temperature, followed in order by urediniospores, aeciospores, and teliospores of Uredinales. The optimum temperatures, however, do not form an exactly parallel series. The time required for spore germination is decreased by approach of all conditions to an optimum. Germination takes place in either light or darkness, and in some cases in water vapor alone, that is, without precipitated moisture.—P. A. Munz.

3428. HOWITT, J. E. **Two diseases new to Ontario.** Sci. Agric. 3: 189. 1923.—Pink root of onions, caused by *Fusarium mali* Taub., and white rot of grapes, caused by *Coniothyrium diplodiella* (Speg.) Sacc. are reported as causing losses in Ontario.—T. G. Major.

3429. KAUFFMAN, C. H., and H. M. KERBER. **A study of the white heart-rot of locust, caused by *Trametes robinophila*.** Amer. Jour. Bot. 9: 493-508. 3 fig. 1922.—A locust tree attacked by this fungus was carefully studied and the diseased area in the wood traced. This may be divided roughly into 3 zones; the black border zone, a fine but distinct brownish-black line separating decayed from apparently sound wood; the lesser decayed portion, still solid in texture but much softer and lighter in texture than sound wood; and the last stages of decay, where the wood is dry and crumbling. These zones and their various constituent elements were tested for cellulose and lignin, and the lignin was found to disappear progressively as decay advanced. The normal wood and that of the 3 diseased zones was also studied histologically. The black border zone seemed quite normal except for holes in the cell walls caused by hyphae, but no mycelium was observable here. The blackish substance seems to be insoluble and its cause and character are unknown. In the lesser decayed zone the hypha holes are notably larger but no hyphae are present. In the badly decayed area the parenchyma cells and vessels are broken down and the wood is held together chiefly by the fibers. No mycelium was found here. In the apparently sound wood just outside the blackish zone, however, mycelium was found in abundance, particularly in ray cells and wood parenchyma. Compression tests of sound wood and of the apparently sound wood just outside the decayed zone showed that the latter was markedly weaker, presumably because of this "advance rot." The problem as to what becomes of the mycelium in the decayed wood is discussed.—E. W. Sinnott.

3430. MANARESI, ANGELO. **La "Sphaerotheca Mors-uvae" (Schw.) Berk. nell' Emilia.** [*Sphaerotheca Mors-Uvae* in Emilia.] Riv. Patol. Veg. 12: 83-84. 1922.—Gooseberry mildew is reported for the first time from Emilia (in Italy) in the summer of 1922 although growers said it had been present for about two years.—F. M. Blodgett.

3431. MELCHERS, LEO E., and JOHN H. PARKER. **Rust resistance in winter-wheat varieties.** U. S. Dept. Agric. Bull. 1046. 32 p., 11 pl. 1922.—Field experiments to determine the resistance to black stem rust (*Puccinia graminis tritici*) of about 100 varieties and strains of winter wheat,—many of them pure-line selections, and a few of them varieties of spring wheat,—were conducted in a rust nursery at Manhattan, Kansas, during the period 1915-17. Special methods were developed for producing severe rust epidemics under the prevailing climatic conditions of Kansas. All winter-wheat varieties grown were found to be susceptible to stem rust except Kanred and two very similar pure-line selections, P1066 and P1068. Plumpness of kernels is usually reduced by severe rust attack. Of spring wheats, Black Persian was the only bread-wheat (*Triticum vulgare*) which was found resistant, but of the durum or macaroni wheats (*T. durum*) there were several resistant varieties. Strains of emmer and einkorn gave some evidences of rust-resistance. In the non-resistant varieties prominent flecks are nearly always present in 8-12 days after inoculation, and most frequently small

uredinia are produced, but in these three varieties which are very rust-resistant flecks are very rarely visible and no uredinia were found. Reports are also given of these varieties in other states where they were in nearly all cases rust-resistant. Distinct strains of stem rust complicate the problem. Perhaps this is why these varieties were not resistant in S. D. and Minn. In Kansas, Kanred yields 3-5 bushels more per acre than the varieties commonly grown. It also ripens earlier and thus escapes some damage by drought and hot wind. It suffers less from winter injury and is equal to the common varieties in milling and baking qualities. Kanred has also proved very satisfactory with farmers and under experimental conditions in Okla., Texas, Nebr., Eastern Colo., and some other states.—*J. T. Buchholz.*

3432. NANGERONI, G. L. *Un oidio delle Cinerarie*. [An *Oidium* of *Cinerarias*.] Riv. Patol. Veg. 12: 85-86. 1922.—An *Oidium* was found attacking young *Cinerarias* but as the perithecial stage was not found the fungus was not determined. It was controlled by sulfuring and the removal of affected leaves.—*F. M. Blodgett.*

3433. RAVAZ, L., et G. VERGE. *Sur la germination des spores du mildiou de la vigne*. [The germination of spores of grape mildew.] Ann. Ecole Nation. Agric. Montpellier 17: 242-245. 1918/1919.—It was found that Bordeaux mixture prevents the germination of mildew (*Plasmopara viticola* (B. & C.) Berl. & DeT.) spores for a long time.—*F. F. Halma.*

3434. SPAULDING, PERLEY. *Investigations of the white pine blister rust*. U. S. Dept. Agric. Bull. 957. 100 p., 6 pl., 13 fig. 1922.—*Cronartium ribicola* has been found on 11 species of white pine but is not known to attack any of the pitch pines. Practically all of the cultivated species of *Ribes* and most of the wild ones have been infected naturally in every extensive outbreak area. The outbreaks of the parasite show that most of the newly formed aecia on the pines are located on nodes and internodes that are three years old or over. The aeciospores are not known to infect pines but readily infect *Ribes* leaves miles away from their source; the urediniospores are not known to infect pines but infect *Ribes* at a distance of several hundred yards. The sporidia produced by the teleospores are not known to infect *Ribes* but do infect pines. Infection by the latter is limited to between 100 and 600 yards and generally only under favorable weather conditions as they are very short lived and easily killed by desiccation. The fungus commonly overwinters on the pine by means of the mycelium, presumably in the needles and very certainly in the bark of the infected white pines. Occasionally it may overwinter by means of the aeciospores in cankers of pine bark or by the urediniospores on *Ribes* leaves, but the aeciospores produced by the overwintered mycelium in the pine bark are the principal source of infection of *Ribes* in the spring. The aeciospores carry the disease far and wide to new *Ribes* leaves and, once started, the urediniospores intensify the disease among the *Ribes* plants. The sporidia carry the disease back to those pines which are near infected *Ribes* bushes. High humidity of the air is necessary for any of the spore forms to germinate and produce infection. Periods of moist weather of 54 hours or longer occurring after June 1 may cause infection in or about the bases of the leaf fascicles of the pines. Wind has been recognized as the most efficient and active agent in the dissemination of spores, though insects and animals such as mice and squirrels are possible means of spread. Control experiments in America and Europe are discussed together with the present status of the problem of control.—*J. T. Buchholz.*

3435. STEVENS, F. L. *The Helminthosporium foot-rot of wheat, with observations on the morphology of Helminthosporium and on the occurrence of saltation in the genus*. Bull. Illinois Nat. Hist. Surv. 14: 77-185. Pl. vii-xxiv, fig. 1-23 and A-Y. 1922.—The symptoms include a rotting of the basal portion of the stem. No weft of superficial mycelium or black incrustation as described for "take-all" were observed. Various fungi were isolated by plating methods, but *Helminthosporium* was the only one constantly found. Growth on various agars is described in detail. Several *Helminthosporium* strains isolated were compared. Rice tubes gave very striking and distinctive colors with a number of the *Helminthosporiums*. The colors varied in different regions of the tube. Other grain media gave color reactions. The important constituents for color reactions seem to be in the aleurone

layer. Cereal seeds (wheat, oats, corn, rye, and barley) were disinfected and sprouted in moist chambers. These were inoculated and all became infected. Corn shoots gave the most luxuriant growth.—A study was made of environmental factors which induced variations. The quantity of nutriment available influenced growth characters. Inhibitory influences increased sporulation. Increased humidity of media (rice) increased growth, but decreased formation of sclerotia. Decreased air humidity resulted in increasing the number of conidia per conidiophore, in reducing the modal mean and length and in increasing the variability.—The optimum growth temperature was found to be about 25°C. Light caused no variations.—Nutritional conditions affected conidial length, septation and shape.—An extensive study was made of the morphology of the mycelium, conidiophores and conidia under standard conditions which are described. The cells of the mycelium are multinucleate.—Special mathematical formulae are given for determining accurately the “coefficient of longitudinal eccentricity” and “coefficient of cylindricity” of the conidia.—“The etiological relation of *Helminthosporium* (H No. 1) to foot-rot was demonstrated by its constant presence, by the absence of other parasites, and by its proved ability to cause infections and rotting under various conditions.”—Many strains of *Helminthosporium* differing morphologically were found to infect and cause rotting in the wheat seedlings. Other fungi tested sometimes infected but did not produce general rotting. “Wheat, corn, barley, rye, sorghum, Sudan-grass, and millet are more or less susceptible to rot by *Helminthosporium*.”—The second part of the article is devoted to an extensive study of saltation within the genus *Helminthosporium*.—“Saltation, possibly mutation, is common in certain races of *Helminthosporium*. Saltation is evidenced in general colony character; rate of growth; conidial production; conidial clusters; conidial length, and breadth; septation, and shape; mycelial characters, color, zonation, and sclerotial formation. Certain saltants differed so markedly from their parents as to far exceed the usually accepted specific limits. Certain correlations and tendencies of characters in saltation were noted. The saltants were, in the main, permanent in character. They were permanent through the conidia. What appeared to be reversions sometimes occurred. Efforts to produce saltations artificially failed. The saltation was not due to mixed plantings, and cannot be induced by implanting or wounding. They are not due to parasites. Saltations in abundance were derived from single conidium cultures. Numerous variations in test tube cultures are reported as probable examples of saltations.”—It is the writer's conclusion that the *Helminthosporium* causing foot-rot belongs to the *Helminthosporium sativum* group which consists of a large number of elementary species.—An extensive bibliography is appended.—H. W. Anderson.

3436. WEBER, GEORGE F. II. *Septoria* diseases of wheat. *Phytopathology* 12: 537-585. Pl. 33-36, fig. 1-16. 1922.—There are 2 distinct diseases of wheat (*Triticum* sp.) produced by species of *Septoria*, (1) the “glume blotch” produced by *S. nodorum* Berk. and (2) the leaf disease produced by *S. Tritici* Desm., here designated “speckled leaf blotch.” Both diseases are quite generally distributed over Europe and North America; and either one may occasionally cause serious loss. The disease produced by *S. nodorum* has been designated “glume blotch” because of the distinct, dark brown, dead areas produced on the glumes and lemmas; but, under conditions specially favoring infection, it also attacks the leaves, the nodes, the culm, and the rachis. The diseased nodes become dark brown to almost black. On the culm the diseased areas are lighter in color and may extend over an entire internode. Inoculations were made by spraying water suspensions of pycnosporos on plants of 41 species or varieties of cereals and related grasses. Infections resulted on all the species of *Triticum*, on *Secale cereale*, and on *Poa pratensis*. In nature infections may occur during any season of the year when the temperature is sufficiently high to allow spore germination. Pycnidia formed in the fall contained pycnosporos that gave 100 per cent germination the following spring. The physiological reactions of the fungus have been studied in cultures and the results throw much light on some characteristics of the disease produced by it.—The “speckled leaf blotch,” produced by *S. Tritici*, is typically a leaf disease. No other parts of the plants are attacked. In the fall, circular or oval, light green areas, thickly dotted with the black pycnidia of the fungus, appear on the leaves of the young plants. After growth starts in the spring the spots gradually elongate

and change to a reddish-brown color. They are at first delimited by the larger veins, but finally involve and kill the entire leaf. Often the entire seedling plant is killed. The fungus was isolated and studied in cultures. Inoculations were made on wheat with conidia and pycnospores from cultures and with pycnospores from the host plants and the disease was reproduced in all cases. Further inoculations were made on about 40 species of cereals and grasses. Infections resulted on the leaf and leaf sheath of *Triticum* sp., on *Secale cereale*, and on *Poa pratensis* but not on any other plants inoculated. Plants of 245 varieties of winter wheat were inoculated and 100 per cent infection was obtained on all varieties. The fungous hyphae are intercellular. The pycnidia develop in the substomatal cavity.—*B. B. Higgins.*

DISEASES CAUSED BY BACTERIA

3437. GARDNER, MAX W., and JAMES B. KENDRICK. **Bacterial spot of cowpea.** *Science* 57: 275. 1923.—This rather destructive disease from Indiana is marked by maroon spots on nearly all parts of *Vigna sinensis* (L.) Endl. By isolations and inoculations the cause has been determined to be a new species, *Bacterium vignae* n. sp. Detailed morphological and cultural characteristics are given. The group number is 211.2322033. Control of the disease lies in the use of seeds from disease-free pods.—*C. J. Lyon.*

3438. RAND, FREDERICK V. **Bacterial wilt or Stewart's disease of corn.** *The Canner* 56¹⁰, Pt. II: 164-166. 1 fig. 1923.—This paper gives some of the practical results of investigations by F. V. Rand and L. C. Cash relative to bacterial wilt of corn (*Aplanobacter Stewarti* (EFS) McCul.). This is a disease of the middle and southern U. S. A. The symptoms, cause, damage done, and relation to soil and climatic conditions are discussed. Numerous data seem to indicate that soil transmission is largely a negligible factor. Seed transmission occurs but is not as important as formerly supposed, save in introducing the disease. Experimental results show that insect dissemination must be reckoned with. A close correlation exists between resistance to wilt and the length of time required to reach maturity, the late varieties being most resistant. The only practical methods of control so far known consist in planting resistant sorts, or growing susceptible varieties only in the northern border states where the disease is not known to occur.—*Frederick V. Rand.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS NEMAS, PROTOZOANS, ETC.)

3439. DEMAREE, J. B. **Kernel-spot of the pecan and its cause.** *U. S. Dept. Agric. Bull.* 1102. 15 p., 5 fig. 1922.—According to the results of this investigation pecan kernel-spot is not due to the fungus *Coniothyrium caryogenum* Rand but to punctures of southern stink bugs (*Nezara viridula*). In 200 out of 250 clusters of Schley and Curtis pecans which were incased with wire, from five to seven specimens of the bugs were confined 5-8 weeks and 50 were left without the insects as controls. None of the latter showed any signs of kernel-spots, while of the nuts caged with bugs 97.6 per cent bore typical kernel-spot. Nuts with which bugs were confined in the laboratory developed kernel-spot in 65 hours but no microorganisms developed from these spots in Petri dish culture. No one organism was found constant in pecan kernels affected with kernel-spot. In 416 cultures of kernel-spots, 265 remained sterile, 71 grew fungi and 80 developed bacteria. Eight species of fungi and 3 of bacteria which were isolated are considered saprophytic; none of these produced typical kernel-spots. The cause of kernel-spots is "attributed entirely to the mechanical rupturing of the host cells, to the sucking of the the plant juices, to the injection of toxic substances into the tissues, or to all three types of injury." Possible control measures are suggested.—*J. T. Buchholz.*

3440. FELT, E. P. **A new gall midge on rushes (Dipt., Cecidomyiidae.).** *Entomol. News* 33: 166-168. 1922.—This is a description of a gall midge reared from *Juncus dudleyi* collected at Centralia, Illinois. The gall is not described, but the author indicates that it is a deformation of the fruit. This is the first definite record from *Juncus*.—*O. A. Stevens.*

3441. FRANÇA, C. Sur les flagellés parasites des latex (à propos de la note de M. Franchini). [On the flagellates of the latex.] Bull. Soc. Path. Exotique 15: 408-410. 1922.—The author refers to Franchini's discussion of his last paper on flagellosis of the Euphorbias, and defends his earlier position with regard to the rôle of the insect *Stenocephalus agilis* as the carrier of the disease in Portugal. *Stenocephalus* is considered the primitive host, in which the leptomonads develop to the metacyclic salivary forms. Besides this insect it is possible that others may transmit the disease mechanically to plants on which they feed.—G. H. Godfrey.

3442. FRANCHINI, G. Essais d'inoculation de différents protozoaires dans le latex des euphorbes. [Attempts to inoculate different protozoa into the latex of the Euphorbias.] Bull. Soc. Path. Exotique 15: 792-795. Fig. 1-2. 1922.—In a previous paper the author, with Laveran, demonstrated the possibility of infecting certain Euphorbias with cultures of *Herpetomonas ctenocephali* var. *Chattoni*. He here describes other experiments along the same line, in which flagellates from diverse sources were used to inoculate several different species of *Euphorbia*. The plants were enclosed in such a way as to prevent the entrance of insects, and check plants were provided. Two plants of *Euphorbia ipecacuanha* were infected with cultures of the kala-azar organism of Indian origin. The parasites appeared 15 to 20 days after inoculation into the latex; at first rare, they finally became numerous. Three months after the inoculation the parasites were still not infrequent. The plants turned yellow and most of the leaves fell; the stalks were arrested in their development, and the sprouts wilted, while the check plants remained in good condition. The latex of the sick plants was very pale, thin, and starch bodies were rare. Typical parasites in different stages of division and of development were readily found in the latex of the diseased plants; and, in sections of the smaller branches, also in the lactiferous vessels and even in the tissues of the plant. A plant of *Euphorbia geniculata* was successfully inoculated with *Herpetomonas Muscae-domesticae*. The parasites found in the latex resembled those in the other case described. Other inoculation attempts were mostly negative. It is considered of great interest, however, that plants were infected with protozoa of human origin.—G. H. Godfrey.

3443. FRANCHINI, G. Flagelles et amibes d'une Urticacee exotique, *Ficus parietalis*. [Flagellates and amoebae of an exotic species of the Urticaceae.] Bull. Soc. Path. Exotique 15: 399-404. Fig. 1-3. 1922.—The writer reports on a flagellate in the fruits of *Ficus parietalis* in the greenhouses of the Paris Museum. The affected fruits appear yellowish, the peel is fleshy and the inside spongy. The grayish latex is very abundant, the reaction acid. Fresh mounts of the latex show an elongate parasite sometimes with a very fine flagellum. In addition to this form which belongs close to the *Herpetomonas* group, numerous trypanosomes were seen. These were mostly larger than those found in the Euphorbias. Similar forms to those found in the fruits were seen in latex from the trunk, branches, and leaves of the plant. Cultures were made from fruits and from the trunk on Nöller plates and in Yoshida tubes, and good growth was secured, especially in the former. Histological studies of sections of fruits gave interesting results. Iron-haematoxylin and eosin were the best stains. The thick cortical substance was not invaded uniformly by the parasites, but here and there little islets of tissue were full of them. The spongy medullary tissue was completely invaded.—G. H. Godfrey.

3444. FRANCHINI, G. Sur une amibe particulière d'une Asclépiadacée. (*Chlorocodon Whitei*.) [A specific amoeba of one of the Asclepiadaceae.] Bull. Soc. Path. Exotique 15: 393-398. Fig. 1-3. 1922.—An amoeba, differing from those previously described is reported in *Chlorocodon Whitei*, from the greenhouse of the Paris Museum. Vegetative forms show accentuated amoeboid movements, sometimes with the emission of pseudopods. The nucleus is round or diffuse, with rare vacuoles. Smaller encysted forms with thicker protoplasm have 1 to several nuclei and differentiated ectoplasm and endoplasm. Cultures on Nöller's medium show growth on the third day at 24°C. in the form of a light scum. Some of the cultured amoebae are seen to be mobile. After 10 to 15 days numerous amoebae variable in size were observed. The largest possessed long pseudopods and appeared in clumps. Some very slender amoebae measured 60-80 $\mu \times$ 4-10 μ . They showed the nucleus in one end, or, in division stages, one at

each end. Sometimes the nucleus is almost as long as the organism. Other amoebae with several pseudopods show several nuclei. Small and medium forms and encysted forms have 1 to several nuclei. Bacteria were never seen within the protoplasm of the parasites, even after contaminations were purposely introduced into the cultures. Multiplication of the amoebae took place more abundantly in the depths of the culture than on the surface. Stained mounts showed differentiation between ectoplasm and endoplasm in the large vegetative forms, and the long pseudopods were mostly ectoplasmic in structure. The nucleus is surrounded by a nuclear membrane and possesses a round nucleole. The zone between the membrane and the nucleole stains feebly and is never granular, in all respects resembling the form seen in the latex. Division is by mitosis, instead of by schizogony. These amoebae do not ingest either red blood corpuscles or bacteria from the medium.—The author is convinced that the amoebae belong to one species which he calls *Amoeba Chlorocodonis*. It lies near the group *Vahlkampfia*, differing in some respects, including the seeming lack of a flagellate stage. Nothing is known as to the possibility of an animal host, except that the organism does not ingest red blood corpuscles. In this respect it differs from other amoebae studied, especially those found in the latex of Apocynaceae.—*G. H. Godfrey*.

3445. FRANCHINI, G. Sur une amibe de la laitue (*Lactuca sativa*). [An amoeba from lettuce.] Bull. Soc. Path. Exotique 15: 784-787. Fig. 1. 1922.—The writer examined numerous lettuce plants in the vicinity of Bologna, finding bacteria in some but no flagellates. In a single instance amoebae were found in a plant that appeared sick, but that did not differ from other plants injured by the heat. The amoebae differed in form and dimensions, showed some movement, delicate protoplasm, rare vacuoles, and no differentiation between ectoplasm and endoplasm. The nuclei possessed nucleoli. Division forms were seen in stained mounts. Cultures were secured on Nöller's medium at about 30°C. The amoebae multiplied, and forms similar to those in the latex were seen. Some of them ingested red blood corpuscles, but this was less manifest than with those from certain Apocynaceae and Urticaceae. Encysted forms were rarely seen. It follows from the above that one can find amoebae in the Compositae, as well as in the other latex bearing plants. Another Composite, *Lactuca virosa*, was examined, without, however, finding the parasites.—Reference is made to a paper by MUSGRAVE, W. E. and M. T. CLEGG [Amoebas: Their Cultivation and Etiologic Significance. Bur. Gov. Lab. Manila Publ. 31. 3-95. 1904.] in which they describe an amoeba found on lettuce leaves. Cultures were made on ordinary bouillon and on solid media. Experimental inoculations were performed on monkeys, and an amoebic dysentery produced. This was in a region near Manila, Philippine Islands, where amoebic dysentery is common. It is believed by the author that the present case is similar to those described in other latex bearing plants, and that the organism was deposited on the plants by insect carriers and penetrated to the interior through lesions. The organism is called *Amoeba lactucae* n. sp.—*G. H. Godfrey*.

INFECTIOUS CHLOROSIS (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

3446. SCHULTZ, EUGENE S., and DONALD FOLSOM. A "spindling-tuber disease" of Irish potatoes. Science 57: 149. 1923.—It has been found that spindle shaped tubers are not necessarily the result of reversion or "running-out" but are the result of an infectious disease. This disease has been transmitted by tuber grafts, leaf-mutilation inoculation and in other ways. No mention is made of the specific causal organism. The tubers perpetuate the disease, which slowly reduces the yield from year to year if spindling tubers are used for propagation.—*C. J. Lyon*.

3447. SMITH, KENNETH M. Mosaic disease in plants. Nature 110: 668. 1922.—This is a brief note reporting the finding, in the tissue of potato plants, bodies apparently similar to those described in maize by Kunkel.—*O. A. Stevens*.

NON-PARASITIC DISEASES

3448. BALLARD, W. S., J. R. MAGNESS, and LON A. HAWKINS. Internal browning of the yellow Newtown apple. U. S. Dept. Agric. Bull. 1104. 24 p., 2 pl. 1922.—Certain apples when kept through a long season in cold storage develop in the fruit flesh a brown discolora-

tion called "internal browning." This trouble is not caused by a parasitic organism, but by physiological conditions within the fruit. Yellow Newtown apples from the Pajaro valley are most susceptible. Here the growing season is cool with high humidity, and the soil is very fertile. Storage at 32°F. causes much greater injury than at 36°-40°F., the latter temperatures very largely preventing serious commercial losses in yellow Newtown apples. Usually the browning increases upon removal from storage. It develops mainly in orchards having high fertility and located in the California coastal fog belt. Orchard fertilizer treatments carried on for four years have neither produced nor prevented browning. The same tree does not bear fruit susceptible to browning year after year, and fruit from a single tree varies during any one year. Apples of large size, high in sugar and acid content and from branches girdled during the growing season browned more easily than normal fruit from the same tree. Partial defoliation tends to prevent the browning. Light crops of large fruit with coarse texture favor internal browning but when heavy crops are produced little browning develops.—*J. T. Buchholz.*

DISEASES OF UNKNOWN CAUSE

3449. KEUCHENIUS, P. E. Onderzoekingen over bruine bastziekte. [Investigations of the brown bast disease.] Arch. Rubbereult. Nederland.-Indië 4: 1-3. 1920.—Bacteria were isolated from the bark of *Hevea brasiliensis* affected with the brown bast disease. Conclusive results have not been secured with inoculations of these bacteria.—*C. D. LaRue.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

3450. APPEL. Die Steigerung der Ernteerträge durch Beizen des Saatgutes. [Increasing yields by seed treatment.] Mitteil. Deutsch. Landw. Ges. 38: 37-39. 1923.—In this address the speaker reviews and discusses apparatus and chemicals used in Germany for the treating of seed against diseases.—*A. J. Pieters.*

3451. BEDFORD, H. W. The asal of cotton and its causes in the Sudan. Wellcome Tropic. Res. Lab. Khartoum Entomol. Sec. Bull. 17. 8 p., 2 fig. 1921.—"Asal is a term widely used in the Sudan for any gummy or sticky substance found on a plant." The asal on the cotton plant is either an exudate from the plant itself caused by an unhealthy condition, or is due to the secretions or excretions of certain insects which feed upon the plants. The plant-asal can be determined by examining the depressions and cups on the leaves and bracts and noting whether an excessive secretion is taking place from these sources; and by the entire or relative absence of asal-producing insects. In conjunction with the excessive secretion of asal, the leaves of the plant turn yellow and drop off in large numbers, together with bracts, flowers and young bolls. Insect-asal is due to the cotton aphid (*Aphis gossypii* Glover), the dura aphid, white fly, and cotton thrips (*Heliothrips indicus* Bagnall).—*Lillian C. Cash.*

3452. COOK, MELVILLE T. The origin and structure of plant galls. Science 57: 6-14. 1923.—Important conclusions developed here include those dealing with the stimulus in the case of insect galls, the nature of the resulting responses, the conditions of the plant cells that allow or qualify response, the classification of galls and the stages in their development. Galls caused by the following organisms are discussed: *Bacterium tumefaciens* (crown gall), *Bacillus radicola* (root tubercles); *Plasmodiophora brassicae* ("club root" disease); *Gymnosporangium juniperi-virginianae*, *G. globosum*, *Rhizoctonia solani*; *Pontania salicis*, *P. pomum*; and insects, including members of the Aphidae, Diptera, Acarina and Cynipidae.—*C. J. Lyon.*

3453. CUNNINGHAM, G. H. Some recent changes in the names of plant-diseases. New Zealand Jour. Agric. 24: 96-102. 1922.—Diseases of cereal, forage and root crops are discussed.—*N. J. Giddings.*

3454. EASTHAM, J. W. Fungicides. Sci. Agric. 3: 190-191. 1923.—Immunity and resistance to disease and recent developments in the use of fungicides in British Columbia are briefly discussed.—*T. G. Major.*

3455. PALMER, R., and W. P. WESTELL. Pests of the garden and orchard, farm and forest: a practical guide for the use of the estate owner, farmer, fruit grower, and gardener, concerning the insects, birds, and other animals, fungoid diseases and weeds, affecting agriculture, horticulture, and forestry; together with remedial and preventive measures. *Roy. 8vo.*, 418 p., 47 pl. (3 col.) Henry J. Drane: London, 1922.—The author aims to give in a concise and yet comprehensive way all the important pests and diseases which injure economic plants, giving information which will enable the reader to identify the cause of the trouble and eradicate it most effectively.—Part I deals with insect pests listed under their common names. A popular description of the various species is given together with the nature of the injury and the specific treatment. Part II deals in a similar way with animals other than insects. In Part III the chief characteristics and treatment for the most prevalent fungous diseases are given. Part IV deals with obnoxious weeds and methods for their destruction; Part V, with insecticides and fungicides, including the chemicals used, methods of preparing, soil sterilization, and antidotes for the poisons used in agriculture; Parts VI and VII give tables, including a table for the identification of the more important insects and diseases, and a spray calendar.—*Lillian C. Cash.*

3456. ROBEL. Heidekrankheit reiner Föhrenbestockung. [Heath disease of pure pine (*P. sylvestris*) stands.] *Zeitschr. Forst.-u. Jagdw.* 53: 321-348. 1921.—This disease attacks pure pine stands during the 4th to 10th years. It results from the destructive combination of the needle-shedding fungus (*Lophodermium pinastri*) due to the increased use of exotic seed, and a succession of dry years, which keeps the stands from closing up and encourages the entrance of heather. It occurs mostly in arid regions with sand and lime soils, and soils deficient in colloids. The root system of heather forms a dense superficial mat, which forces the pine to root in the same manner and makes it dependent entirely upon the occurrence of timely rains. It is believed that the heath humus at the same time has a toxic effect upon the pine through the medium of the nutrient materials in the soil. Careful and continuous soil cultivation will keep out heather, but this is financially impossible. Closed stands, which must be the goal of all combat measures, are necessary to prevent the entrance of heather.—*J. Roeser.*

3457. SECRÉTAIR, CHARLES. Notes séricicoles. [Notes on silk production.] *Ann. Ecole Nation. Agric. Montpellier* 17: 191-226. 1918/1919.—Silkworms showed symptoms of the fatal disease called "grasserie" when fed even part of the time with leaves of *Scorzonera Hispanica* or of *Maclura*. The results of the study of this disease were inconclusive. A bibliography on the feeding and diseases of the silkworm is appended.—*F. F. Halma.*

3458. TROTTER, A. Intorno al seccume degli aghi ed agli altri fenomeni patologici del Pino domestico (*Pinus Pinea* L.). [A blight of the needles, and other pathological phenomena of *Pinus pinea* L.] *Riv. Patol. Veg.* 12: 91-106. 4 fig. 1922.—A blight of the needles of *Pinus Pinea* L. was noted in the vicinity of Avellino, causing a yellowing and drying up of the needles proceeding from the apex toward the base, also various surface markings and the emission of drops of resin. Two fungi were found on such needles, namely *Pestalozzia Hartigi* Tubeuf and *Cladosporium Laricis* Saccardo. A list of fungi and insects recorded as affecting this pine, classified according to the parts of the plant which they attack is appended.—*F. M. Blodgett.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 2957, 3048, 3123, 3199, 3200, 3272, 3301, 3370, 3507)

3459. BEVAN, W. Lavender. *Cyprus Agric. Jour.* 17: 22. 1922.—The Cyprus Agricultural Department is establishing a small lavender field for the purpose of testing its value as a source of oil. If the experiment is successful it is proposed to supply cuttings to those wishing to engage in the lavender industry.—*Wm. Stuart.*

3460. GRAHAM, ROBERT, and I. B. BOUGHTON. An outbreak of "trembles" or milk sickness. *Vet. Med.* 18: 31-33. 1923.—A brief résumé of the history of milk sickness with reference to *Eupatorium urticaefolium* as the causative factor is followed by an account of some experimental work which seems to confirm the Eupatorium theory. A history of an outbreak of the disease at Paxton, Illinois is given.—*C. D. Marsh.*

3461. JOHNSON, E. P. Oak poisoning—a reply. *Vet. Med.* 18: 70-71. 1923.—In reply to a preceding article which intimated that shinnery poisoning was really haemorrhagic septicemia, the author points out differences between haemorrhagic septicemia and oak poisoning.—*C. D. Marsh.*

3462. KEENAN, GEORGE L. Significance of wheat hairs in microscopical examination of flour. *U. S. Dept. Agric. Bull.* 1130. 7 p., 5 fig. 1923.—The author shows a significant relationship between wheat-hair count and the flour classified according to milling practices. For analytical purposes, milling processes employed in a given sample should be known; but, in general, flours made from purified middlings material show a low hair count, while flours containing lower-grade mill stocks show a much higher hair count.—*J. T. Buchholz.*

3463. PETRIE, JAMES M. The active principle of *Erythrophloeum Labouchei*. (Includes a section by PETRIE, J. M., and H. PRIESTLEY. Physiological action of *E. Labouchei*.) *Proc. Linn. Soc. New South Wales.* 46: 333-348. Pl. 23-24. 2 text fig. 1921.—*Erythrophloeum Labouchei*, *Labouchei chlorostachya* v. Mueller, *E. chlorostachys* (F. v. M.) Ballin (Leguminosæ) is the ironwood or ironbark tree endemic in northern Australia and Queensland. Twelve species of this genus are known. *E. guineense*, the Nkasa or "doom or ordeal tree" of western and central Africa has wood used for poison arrows and infusions. It contains a very poisonous alkaloid erythrophleine, as do *E. coumunga* of Madagascar and *E. Fordi* of China. No poisonous material was found in *E. densiflorum* (Elmer) Merrill of the Philippine Islands. The wood of the Australian species is red and exceedingly hard, probably the hardest of all Australian timbers. It was used by the aborigines for womerahs and spear heads and has long been known to be poisonous. Much stock is killed by eating the leaves. The poison absolutely destroys the optic nerve, even a splinter of wood being dangerous and in powdered form the wood produces violent and irresistible sneezing. The formula of erythrophleine has been provisionally given as $C_{23}H_{43}O_7N$. Air dried leaves and a few beans were used in this study of the Australian species. Leaf powder was extracted with alcohol and ether and the alkaloid precipitated. From the leaves 0.002 per cent of amorphous white alkaloid was obtained and 0.03 per cent of apparently identical material from the beans. This is insoluble in water but soluble in alcohol, ether, ethyl acetate, chloroform, amyl alcohol and acidulated water. Solutions were red, strongly alkaline and bitter. Their chemical characteristics are discussed. The physiological action was observed as follows: powdered leaves are a violent external irritant and cause sneezing; solutions administered to animals cause a complete change in heart-rhythm and respiration, blood-pressure rises, and convulsive movements occur. The results obtained would refer the alkaloid to the digitalis group in its pharmacological action and it closely resembles the descriptions of erythrophleine. The properties exhibited by these alkaloids are those hitherto known to belong only to certain glucosides. A possible analogy to myrticolorin, a flavone glucoside with an astringent and very bitter taste is suggested in connection with the properties observed for the extract from *E. Labouchei*.—*Eloise Gerry.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

WILLIAM J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 2924, 2933, 2993, 2998, 3005, 3150, 3164, 3226, 3258, 3281, 3297, 3303, 3354, 3406, 3407, 3427, 3448, 3452, 3581)

GENERAL

3464. ANONYMOUS. Chemistry of the plant cell. [Rev. of: GRAFE, VICTOR. *Chemie der Pflanzenzelle*. (Chemistry of the plant cell.) viii + 421 p. Gebrüder Borntraeger; Berlin,

1922.] *Nature* 110: 403-404. 1922.—The subject is treated mainly from the point of view of physical chemistry and the book shows lack of proportion and of arrangement.—*O. A. Stevens.*

3465. ANONYMOUS. *Physiology of the growing plant.* [Rev. of: MOLLIARD, M. *Encyclopedie scientifique: Bibliotheque de physiologie et de pathologie végétales: Nutrition de la plante.* 1. *Echanges d'eau et des substances minerales.* [Scientific encyclopedia: Plant physiology and pathology: 1. Transport of water and mineral substances.] *xiv* + 395 p. 2. *Formation des substances terrires.* [2. Formation of food materials.] *vi* + 438 p. Gaston Doin: Paris, 1921.] *Nature* 109: 769. 1922.—The reviewer finds that these volumes "give to the chemist much information that he does not possess although it may be well known to the botanist, and they give to the botanist a survey of chemical relationships which he might not find so easily elsewhere." It is also found, as might be expected in so extensive a treatise, that much recent work is not included, notably in the section on soils. It is suggested that adequate references should be furnished.—*B. M. Duggar.*

3466. CONARD, H. S. *Yeasts.* [Rev. of: GUILLIERMOND, A. T. *Les levures. (The yeasts.)* II. 565 p. Paris, 1912. Translated and thoroughly revised in collaboration with the original author by F. W. TANNER. *xix* + 424 p. New York, 1920 (see Bot. Absts. 8, Entry 2057).] *Bot. Gaz.* 74: 335-336. 1922.—The reviewer highly commends the original work for its "terse statements of observation and carefully balanced discussion." Regarding the later American edition the reviewer believes the translation to have been poorly done, so badly done in fact that "no one can safely use it without a copy of the original at hand." [See also Bot. Absts. 11, Entry 2742.]—*B. W. Wells.*

3467. ERRERA, L. [Published by] *Recueil de L'Institut Botanique Léo Errera.* 4: 1-653. 6 pl., 34 fig. 1920.—This volume contains reprints of 36 articles contributed by members of this botanical institute to various journals between 1884 and 1898. The majority of the articles are those contributed by Léo Errera but the following authors are also included: G. CLAUTRIAU, E. DE WILDEMAN, E. LAURENT, G. BULLOT, FR. VAN RYSSSELBERGHE, J. MASSART, J. BORDET, E. HECKEL. The majority of these articles are of physiological significance, and it is of interest to have them brought together in a single volume.—*B. M. Duggar.*

3468. FERNBACH, M. *Sur l'achèvement de la fermentation des vins restés doux.* [The completion of fermentation in wines remaining sweet.] *Bull. Officiel Direction Recherches Sci. et Indust. et Inventions* 1922²⁸: 74-79. 1922.

3469. HALLIBURTON, W. D. *The essentials of chemical physiology for the use of students.* 11th ed., demy 8 vo, *xi* + 343 p. Longmans Green & Co.: London, 1922.

3470. PAULI, WO. *Colloid chemistry of the proteins. Part 1.* Translated by P. C. L. THORNE. 140 p., 27 fig. Churchill: London; P. Blakiston's Son & Co.: Philadelphia, 1922.—This book summarizes much of the work of the author, particularly on the behavior of albumin and certain other proteins in acid and alkaline solutions, and is based on lectures delivered in 1912-13. To a degree the relevant work of other authors is included, but no attempt has been made either by the author or the translator to bring the work strictly up to date. Besides general considerations, the topics treated are conditions of stability, the electric charge on natural soluble albumin, the isoelectric reaction, salts of acids and albumin, salts of albumin and bases, alterations of state in alkali proteins, and migration velocity of the ions in salts of the globulins.—*B. M. Duggar.*

3471. PEARL, RAYMOND. *The biology of death.* 275 p. 64 fig. Lippincott Co.: Philadelphia, 1922.—From evidence adduced from general and experimental biology and from vital statistics the author attempts to establish the hypotheses that "natural death is not a necessary or inevitable consequence of life" but rather "a by-product of progressive evolution—the price we pay for differentiation and specialization of structure and function;" that

"the duration of life is an inherited character of an individual;" that "probably . . . environmental circumstances play their part in determining the duration of life largely . . . by influencing the rate at which the vital patrimony is spent."—*Carl Epling.*

3472. WINTERSTEIN, HANS [Editor]. *Handbuch der vergleichenden Physiologie. I. Physiologie der Körpersäfte, Physiologie der Atmung.* (2nd part. [Handbook of comparative physiology. I. Physiology of body fluids, physiology of respiration (2nd part).] 1052 p., 180 fig. Gustav Fischer: Jena, 1921.—The 2nd half of volume 1 of this work is devoted to 2 phases of the subject: (1) the physico-chemical phenomena of respiration, by Hans Winterstein; and (2) the mechanics and control of respiration, by EDWARD BABÁK. After a general introductory discussion, 20 pages are devoted to the phenomena of respiration in plants including such topics as gas exchange, the tissue atmosphere, and the oxygen reserve. The remainder of the 1st division treats of respiratory phenomena in the various groups of animals from protozoans to vertebrates. In the 2nd division of the subject there is no relation to plant work.—*B. M. Duggar.*

DIFFUSION, PERMEABILITY, ADSORPTION

3473. BETHE, A. *Der Einfluss der H-Ionenkonzentration auf die Permeabilität toter Membranen, auf die Adsorption an Eiweissolen und auf den Stoffaustausch der Zellen und Gewebe.* [The effect of hydrogen-ion concentration on the permeability of dead membranes, on adsorption by protein sols, and on the metabolism of cells and tissues.] *Biochem. Zeitschr.* 127: 18-33 Fig. 1-4. 1922.—This is a study of the dialysis relations of a number of acid, basic, and amphoteric stains to solutions of varying H-ion concentrations, to protein sols (gelatine, serum, and milk) and to yeast, bacteria, and cells of higher plants. The usual parchment membrane method was employed. The data were based on colorimetric determinations. A very marked relation between H-ion concentration and permeability was noted. Dialysis of acid stains was increased by an acid reaction and decreased by an alkaline condition. The reverse held for basic stains. Increased adsorption by proteins occurred when an acid stain in acid solution was used. A negative adsorption was found in the case of acid stains in alkaline solutions. The opposite results were obtained with basic dyes. The phenomena were reversible. Results obtained with living, single celled organisms are regarded as partially confirmatory. Cells of higher plants (*Spirogyra*, carrot, and epidermis of carnation) were also used. The author concludes that cell content rather than the plasma membrane is the determining factor in penetration of stains, and he considers that the results with living cells in general support the theory of H-ion concentration as a factor in vital staining.—*W. W. Bonns.*

3474. COLLANDER, R. *Über die Permeabilität pflanzlicher Protoplasten für Sulfosäurefarbstoffe.* [The permeability of plant protoplasts for sulphonic acid dyestuffs.] *Jahrb. Wiss. Bot.* 60: 354-410. 1921.—There is considerable disagreement in the literature concerning the permeability of acid dyes. The problem here is a quantitative consideration of all cases, including the penetration of the dye into the cell, non-penetration, and loss of natural color by the cell. The dyes used (cyanol extra, orange G, Säuregrün, Lichtgrün, Ponceau GG, Wallviolett S, brilliant orange R, Metalingelb Ia, Echtröt A, Tuchscharlach G) are listed in respect to relative reducibility in dextrose and NaHSO_3 , relative diffusibility in agar and gelatine, surface tension (by means of a stalagmometer), capillary quotient, and their partition coefficient between a mixture of diamylamine, oleic acid, and almond oil, on the one hand, and water, on the other.—In determining the concentration of the dye taken up by the cells, hand sections were cut 200-800 microns in thickness and placed in a concentrated solution. After a definite period of time the sections were removed and examined under the microscope, using the original concentrated dye for a medium. This was then diluted by definite amounts until the lightest of the cells were just perceptibly lighter than the surrounding medium, thus determining the concentration of the dye within the cells. To check his results the author then plasmolyzed the tissue in a salt solution. Detailed data are given (using the first 5 of the dyes mentioned) for the following plants: *Allium Cepa*, *Agreecum eburneum*, *Avena sativa*,

Begonia sp., *Beta vulgaris*, *Boehmeria gigantea*, *Brassica napus*, *Centaurea montana*, *Chrysanthemum* sp., *Coleus hybridus*, *Daucus carota*, *Dianthus* sp., *Elodea densa*, *Eupatorium grandiflorum*, *Helianthus annuus*, *H. doronicoides*, *H. orientalis*, *Lemna minor*, *Lepidium sativum*, *Malva borealis*, *Oxalis* sp., *Pistia stratiotes*, *Pisum sativum*, *Pothos aurea*, *Primula sinensis*, *Rheum raponticum*, *Rhoeo discolor*, *Senecio cruentus*, *Spirogyra* sp., *Trapaeolum majus*, *Tulipa Gesneriana*, *Vicia faba*, *Zingiber zerumbet*. These experiments show that most plant cells, put into concentrated solutions of easily diffusible sulphonic acid dyes, allow the dye to penetrate only in $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{64}$, or $\frac{1}{128}$ the original concentration, and that different plants and different histological elements of the same plant behave very differently toward a given dye. The author thinks this is due to individual differences in permeability and not to H-ion concentration. As regards the other dyes, those soluble in diamylaminol seem to be the most permeable.—A series of experiments on the concentration of the dye solution surrounding the tissue (the technique was by color comparison) showed that the lack of coloration in most of the cells was due to non-penetration rather than to penetration and subsequent reduction of the dye to a colorless compound. Controls with dead material and agar showed that any decolorization of the solution was due to adsorption of the dye by cell membranes, etc. The possibility is discussed that the relative non-penetration may be explained by Donnan's theory of membrane equilibrium, but experiments with dyes in salt solutions show that this is not the case. Work on the effect of other factors show that: (1) low temperature retards penetration, and the temperature coefficient is greater than the coefficient of diffusion; (2) narcotics retard penetration, (3) as also OH ions, but (4) polyvalent cations have no effect.—After a considerable discussion of Ruhland's ultra filter theory, Bethe's vital staining theory, Nirenstein's lipid theory, Overton's lipid theory, Traube's surface tension theory, and the electrical theory of ion permeability, the author concludes that the above results are in accord with Overton's lipid theory, with the conception of absorption, as also with the assumption that the varying permeability for dye-stuffs is dependent on electrical forces.—S. F. Cook.

3475. CROZIER, W. J. Cell penetration by acids. V. Note on the estimation of permeability changes. Jour. Gen. Physiol. 4: 723-731. Fig. 1-2. 1922.—A method is described for measuring the time of penetration of acids into the mantle tissue of *Chromodoris zebra*. The penetration of acid (dichloroacetic) into the mantle tissue is accelerated after faradic stimulation and an artificial stretching of the tissue. Brief treatment by anaesthetics retards the penetration of acid. The spontaneous outward diffusion of intracellular pigment is an inadequate criterion of permeability. Artificial tension accelerates the outward diffusion of intracellular pigment.—O. L. Inman.

3476. CROZIER, W. J. Cell penetration by acids. VI. The chloroacetic acids. Jour. Gen. Physiol. 5: 65-79. Fig. 1-9. 1922.—Measurements of the penetration of tissue taken from *Chromodoris zebra* are believed to show that a determining factor in penetration involves the establishment of a critical pH (near 3.5) in relation to superficial cell proteins. The rapidity with which this state is produced depends upon acid strength and upon some property of the acid influencing the speed of the absorption; hence it is necessary to compare acids within groups of chemical relationship. The actual speed of penetration observed with any acid is dependent upon 2 influences: (1) preliminary chemical combination with the outer protoplasm, followed by (2) diffusion.—O. L. Inman.

3477. DAVIS, CHARLES E., EARLE T. OAKES, and HAROLD H. BROWNE. Viscosity of gelatin solutions. Jour. Amer. Chem. Soc. 43: 1526-1533. 1921.

3478. EWART, A. J. On the changes of volume in a mixture of dry seeds and water. Proc. Roy. Soc. Victoria 34: 172-179. 1922.—Marked changes of the total volume are shown when dry seeds (peas, lentils, beans, barley) absorb water. If the seed coat wrinkles there is first an expansion, then a contraction, and then a final rise which is due to the production of gas in the seed. The changes are not the result of alterations of temperature. The wrinkling is due to unequally rapid absorption, partial vacuums forming under the wrinkles, this hasten-

ing the intake of water. If the seed coat does not wrinkle there is no preliminary expansion, and the contraction is due, as in gelatine, to the compression of the absorbed water.—Using methods similar to those with seeds, the contraction obtained with gelatin indicated a pressure of 20 atmospheres, but with seeds as much as 50 to 120 atmospheres were indicated. This may be due partly to the greater imbibition pressure of organized cellulose, as compared with gelatin, and partly to the influence of solutes increasing the internal pressure of the water within the seeds.—*Eloise Gerry.*

3479. HARVEY, NEWTON E. **The permeability of cells for oxygen and its significance for the theory of stimulation.** Jour. Gen. Physiol. 5: 215-222. 1922.—By use of the ciliated gill of *Mytilus*, of muscle, liver, and nerve of a frog it is demonstrated by the indicator method that living cells are as freely permeable to oxygen as dead cells and that sudden admission of oxygen to a cell cannot account for increased oxidation as a result of stimulation. Oxygen penetrates as readily as carbon dioxide among the acids and ammonia among the alkalis. More oxygen may enter a cell at high pressure, but the reacting substances (chromogen and oxidase) are kept apart by some phase boundary as long as the cell is alive. Increased oxygen concentration eventually produces injury to the cell.—*O. L. Inman.*

3480. JACOBS, M. H. **The influence of ammonium salts on cell reaction.** Jour. Gen. Physiol. 5: 181-188. 1922.—That the pH within the cell may bear no necessary relation to the pH of the medium to which the cell is exposed is shown by the fact that cells of the flowers of a hybrid *Rhododendron* with natural indicator, starfish eggs stained with neutral red, and an artificial cell in which living frog skin is used all show that increased intracellular alkalinity may be brought about by solutions of a decidedly acid reaction which contain ammonium salts. This depends upon the fact that NH_4OH is a weak base and permits a certain degree of hydrolysis of its salts, also that living cells are freely permeable to NH_4OH (or NH_3 ?) and not to mineral and many organic acids, and presumably not, at least to the same extent, to ammonium salts as such.—*O. L. Inman.*

3481. OSTERHOUT, W. J. V. **Some aspects of selective absorption.** Jour. Gen. Physiol. 5: 225-230. Table 1. 1922.—By use of the cell sap of *Valonia* it is shown that a mechanism exists which prevents certain substances (Na , Mg , Ca , SO_4) from reaching as high a concentration inside the cell as in the sea water which surrounds the cell. Potassium is trapped and accumulates in the cell in a concentration far in excess of that found in the surrounding sea water. Practically all the K in the cell exists as KCl . The concentration of Cl does not differ greatly within and without the cell. The concentrations of the various ions were determined by chemical analyses.—*O. L. Inman.*

3482. REDFERN, GLADYS M. **On the course of absorption and the position of equilibrium in the intake of dyes by discs of plant tissue.** Ann. Bot. 36: 511-522. 8 fig. 1922.—Discs 1 mm. thick of carrot, potato, artichoke, and turnip were placed in the dye solution and the amount of absorption was determined colorimetrically. Series of experiments were made with neutral red, methylene blue, methyl violet, aniline blue, eosin, and Congo red on both living and killed tissue, and the absorption curves obtained in all cases. The curves showed that equilibrium is reached more rapidly the more concentrated the dye and that the basic dyes penetrate more rapidly than the acid dyes. There was no difference in the rapidity of absorption between living and dead tissue. After mathematical analysis, the author concludes that the relation between the final internal and external concentrations of the dye may be expressed by the adsorption equation and that, consequently, adsorption must play an important part in dye penetration.—*S. F. Cook.*

3483. RUDOLFS, W. **Effect of seeds upon hydrogen-ion concentration of solutions.** Bot. Gaz. 74: 215-220. 1922.—The author finds that immersing seeds such as corn, wheat, lupine and watermelon in single salt solutions of relatively high concentration (2-7 atmospheres) induces an increase of the H -ion content. This increase reaches a maximum, the value of

which is constant for each species. In dilute solutions (0.5–0.001 atmospheres) the increase was not so great. The writer believes "that the primary factor, and the only one which could account for the rapid reaction changes in the single salt solutions here used, is that directly related to the ion absorption by the seeds, the H-ion concentration increasing as the cations are removed from solution by absorption at a more rapid rate than the anions."—*B. W. Wells.*

3484. SMITH, C. R. Osmosis and swelling of gelatin. *Jour. Amer. Chem. Soc.* 43: 1350–1366. 1921.—Gelatin was prepared free from electrolytes. The osmotic pressure of this gelatin in water is proportional to the concentration. When this gelatin sol is put into a collodion membrane and is immersed in isohydric solutions of univalent acids, or polyvalent acids ionizing as univalent acids, the same osmotic pressure is produced. Also when it is immersed in univalent bases the same osmotic pressure is produced at the same hydroxyl-ion concentration.—"Minimum osmotic pressure is produced at the iso-electric point where it is not combined with acids or alkalies. With increasing hydrogen-ion or hydroxyl-ion concentration the osmotic pressure increases to a maximum and then diminishes."—"The maximum osmotic pressure for 0.5 gm. of gelatin per 100 cc. at 10° in univalent acids or polyvalent acids ionizing as univalent acids, is reached at a hydrogen-ion concentration of 0.8 to 1.0×10^{-3} , and amounts to about 158 mm. of water. In univalent bases the maximum is reached at 0.2×10^{-3} hydroxyl-ion concentration and amounts to about 165 mm."—"Using bivalent acids or bases ionizing as such, the maximum osmotic pressure is reached at the same hydrogen-ion or hydroxyl-ion concentration as with univalent acids or bases, respectively, but amounts to about 55 mm."—"When dry gelatin is immersed in univalent acids, or polyvalent acids ionizing as univalent, it combines with equivalent amounts at the same hydrogen-ion concentration. The amount of swelling is approximately the same for all, its maximum occurring at about 4×10^{-3} hydrogen-ion concentration when one gm. of air-dry gelatin occupies a volume of 46 cc. Bivalent ionizing acids give much less swelling with a maximum at about the same point, and combine in somewhat greater equivalent amounts."—"The salt ions do not combine with gelatin but increase the absorption of acids or alkalies. They decrease swelling."—"The swelling of gelatin is the result of osmotic pressure within the jelly, with the jelly acting as an imperfectly resisting membrane, the more so when highly swollen. While the osmotic pressure at the optimum concentration of the univalent acids and bases is the same, the swelling is much less in alkalies because of the weakened membrane effect. Bivalent sulfuric acid gives the same swelling as bivalent calcium or barium hydroxide when the swelling is small and the solution is not too great."—*J. M. Brannon.*

WATER RELATIONS

3485. BURGERSTEIN, ALFRED. *Die Transpiration der Pflanzen. Zweiter Teil (Ergänzungsband).* [Transpiration. Part II.] 264 p., 18 fig. Gustav Fischer: Jena, 1920.—Burgerstein's 1st volume, *Die Transpiration der Pflanzen, Eine physiologische Monograph*, a critical summary of the work on transpiration up to that date, was published in 1904. The present volume is a continuation of that work and brings the review of literature down to the beginning of 1920. In the 1st volume 393 papers were cited and in this 2nd, an additional 505. The present volume has 32 chapters, as follows: Chap. 1 is a discussion of relative transpiration, specific transpiration, correlative transpiration, etc.; Chap. 2 includes a discussion of cobalt-paper methods, methods of collecting transpired water, automatic weighing devices and other instruments used in measuring transpiration; Chap. 3, gives new methods of measuring stomatal openings, such as the alcohol fixation method, the potometer method, the infiltration method, and the gas diffusion method; Chap. 4 discusses potometers and atmometers; Chap. 5, physics of transpiration; Chap. 6, influence of outer and inner factors, of CO₂ content of the air, and of wilting on stomatal opening, the effect of stomatal opening on rate of transpiration and the effects of diurnal changes; Chap. 7 considers the influence of external factors such as light and soil moisture on the formation and number of stomata; Chap. 8 deals with the transpiration of correlative leaves, young and old leaves, leaves in different positions on the stem, upper and lower surface, red and green leaves; Chap. 9 is on the transpiration of flowers; Chap. 10, the influence of light on transpiration; Chap. 11, the influence of air tem-

perature; Chap. 12, the influence of air humidity; Chap. 13, the influence of air movement; Chap. 14, the influence of elevation; Chap. 15, the influence of soil water content; Chap. 16 gives the influence of chemicals on transpiration, especially acids and alkalis, salts, nutrients, Bordeaux mixture, carbon dioxide, hydrogen, sulphuric acid, ether and chloroform; Chap. 17 considers the amount of transpiration of different ecological plant types; Chap. 18 treats of the determination of transpiration in different seasons and times of day; Chap. 19, of the amount of transpiration in the Mediterranean region; Chap. 20, of the amount of transpiration in the moist, warm, tropical region; Chap. 21, of the influence of transpiration on the leaf movement of Marantaceae; Chap. 22, of transpiration of bearded and beardless heads; Chap. 23 discusses the influence of transpiration on the formation of the fruiting bodies of fungi; Chap. 24 gives the influence of fungous infection on the transpiration of food plants; Chap. 25 considers the water requirement of agricultural plants; Chap. 26, the wilting of plants and the water content of the soil; Chap. 27 treats of miscellaneous features; Chap. 28, of guttation; Chap. 29, of the varied protective arrangements for decreasing the loss by transpiration; Chap. 30 considers transpiration as a necessary evil; Chap. 31, means favoring transpiration; Chap. 32, compiled material. Literature is cited. [See also Bot. Absts. 12, Entry 3490.]-H. L. Shantz.

3486. DIXON, H. H. **Transport of organic substances in plants.** *Nature* 110: 547-551. 1922.—The generally accepted view that the bast serves for the downward transport of materials was supported especially by Czapek's work. Deleano, however, found that leaves apparently similar often behave differently with regard to starch depletion, and showed that a leaf may be depleted in 35 hours without transport, and that depletion continues if the petioles have been killed by heat or chloroform vapor. This indicates that living elements are not essential, while Czapek believed that they were.—Apparently none of the earlier investigators made estimates of the actual amounts transported or the velocity necessary. Calculations indicate rates (20 cm. to 140 cm. per hour) which seem quite impossible in the bast. The tracheae of the wood are naturally suggested as possible channels. A reversal of the transpiration current has long been known to take place under certain conditions. It may be demonstrated by cutting the tip of a potato leaf under eosin, or by placing one side of a *Sambucus* petiole in eosin.—The work of Ricca on *Mimosa* shows that the transmission of stimuli can scarcely be by pressure waves through the bast as believed by Haberlandt. From the work of Ricca, Boyce-Jensen, Páal and Stark it appears that such transmission probably is by hormones set free in the transpiration current. The mechanism of the downward stream is unknown, but the work of Thoday on volume changes in leaves suggests a means. If these changes are accompanied by changes of permeability of the plasmatic membranes, the necessary rate of flow through the tracheae could be produced. The function of the bast may be to supply the materials to the tracheae.—O. A. Stevens.

3487. GORTNER, ROSS AIKEN, and WALTER F. HOFFMAN. **Determination of moisture content of expressed plant tissue fluids.** *Bot. Gaz.* 74: 308-313. 1922.—The purpose of this paper is to recommend the use of refractometers, comparable to those used by sugar manufacturers, in the determination of the moisture-solute ratio of plant sap. The authors used a high grade Abbé refractometer provided with a special sugar scale which was carefully standardized by the Bureau of Standards [U. S. A.]. This method surpasses the older one in that only 2 or 3 drops of sap are required; direct readings are made; volatile substances which may occur in the sap are included in the estimate. They believe the refractometer reading to "more nearly express the true value of the moisture content than can be obtained by any known method."—B. W. Wells.

3488. NICHOLS, G. E. **The Musch rain-correcting mounting for porous porcelain atmometers.** *Science* 57: 26-28. 1923.—This describes a modification of the Livingston-Thone mounting (see *Science* 52: 85-87. 1920.) Instead of the short mercury column being held in place in the upper part of a straight glass tube by glass wool, the tube is bent like a J and the mercury rests in the curve. The long arm leading up from the water reservoir to the atmometer

eter has a side arm connecting to it about $1\frac{1}{2}$ inches from the bottom of the J and extending outward and upward. This side arm holds the mercury when the whole apparatus is inverted to fill the atmometer or remove air bubbles. This modification has been thoroughly tested in the field.—*C. J. Lyon.*

3489. SAYRE, J. D. **Physiology of stomata of *Rumex patientia*.** *Science* 57: 205-206. 1923.—This is a concise list of conclusions regarding the behavior of the stomata of *Rumex patientia*. Most important is the fact that it is the acidity of the guard cells that controls the opening and closing of the stoma. The acidity, itself controlled by light, affects the point of equilibrium of the starch-sugar change in the guard cells and this regulates the osmotic pressures therein.—*C. J. Lyon.*

3490. SHANTZ, H. L. **Transpiration of plants.** [Rev. of: BURGERSTEIN, A. *Die Transpiration der Pflanzen. Zweiter Teil. (The transpiration of plants.)* Jena, 1920 (see Bot. Absts. 12, Entry 3485).] *Bot. Gaz.* 73: 239-241. 1922.—Following the abstract of the volume the author states that "this work is a valuable summary and no investigation of transpiration is feasible without consulting it."—*B. W. Wells.*

MINERAL NUTRIENTS AND SALT RELATIONS

3491. ARRHENIUS, OLAF. **Absorption of nutrients and plant growth in relation to hydrogen ion concentration.** *Jour. Gen. Physiol.* 5: 81-87. *Fig. 1-6.* 1922.—By means of water culture experiments with radishes and wheat it is shown that the absorption of nutrient salt depends much upon the pH of the substrate. At maximal growth of the plant the salt intake is at a minimum. In unbalanced solutions salt intake may be greater, and different ions are differently affected. The intake of water is independent of the absorption of salts.—*O. L. Inman.*

3492. FERLAND, J. **Les matières minérales des plantes.** [The mineral content of plants.] *Sci. Agri.* 3: 229-230. 1923.—The ash content of plants and the function of the various minerals is outlined.—*T. G. Major.*

3493. GERICKE, W. F. **Protective power against salt injury of large root systems of wheat seedlings.** *Bot. Gaz.* 74: 204-209. 1922.—In this experiment wheat seedlings with roots 70-80 cm. long (class A) and seedlings with roots 8-10 cm. long (class B) were tested in 3 nutrient solutions varying in their salt content, the physiological values of which were known and were rated "good," "medium," "poor." Growth, judged from dry weight data, in the case of class A plants was approximately equal in all 3 solutions, while in the case of class B plants striking differential results were obtained in the solutions which deviated from the theoretical optimum. The conclusion was reached that "the extent of the root system appears as an important factor that affects the magnitude of growth obtainable from a given nutrient solution."—*B. W. Wells.*

3494. KISSER, JOSEPH. **Über den mikrochemischen Nachweis gelöster Kalziumsalze in der Pflanze als Kalziumtartrat.** [Microchemical proof of a dissolved calcium salt in the plant as calcium tartrate.] *Beih. Bot. Centralbl.* I Abt. 39: 116-127. 1922.—With a solution of the calcium salt in water, the neutral tartrate gives a beautiful crystalline precipitate of calcium tartrate. Heating hastens the reaction. Because of their size and good reflection of light, these crystals are very distinct.—With this method, of the plants investigated, 7 were rich in the calcium salt, 4 contained a medium quantity, and 5 gave no trace.—*L. Pace.*

3495. LOEB, ROBERT F. **Radioactivity and physiological action of potassium.** *Jour. Gen. Physiol.* 3: 229-236. 1920.—It has been suggested that one of the important functions of the K ion in physiological phenomena is dependent on its slight radioactive properties. The writer finds that with respect to their influence on development of sea urchin eggs and antagonistic action in salt solutions the radioactive elements Th and Ur are of no value as sub-

stitutes for K, while the non-radioactive elements Cs and Rb are very effective substitutes.—*Otis F. Curtis.*

3496. MELLON, RALPH R. Spontaneous agglutinability of bacteria in relation to antagonistic action of certain cations. (Abstract.) *Absts. Bact.* 6: 484. 1922.—Spontaneous agglutinability of 5 pure-line cultures of *B. diphtheriae* is shown to be a function of growth cycle developments.—*D. Reddick.*

3497. NĚMEC, ANTONÍN, und VÁCLAV KÁŠ. Über den Einfluss des Selen auf die Entwicklung einiger Schimmelpilze aus der Gattung *Penicillium*. [On the influence of selenium on the development of some mildews of the genus *Penicillium*.] *Biochem. Zeitschr.* 114: 12–22. 1921.—The writers used a modification of Raulin's nutrient solution, to which a small amount of $ZnSO_4$ and $MnCO_3$ had been added. To this standard nutrient solution Na_2SeO_3 was added in amounts varying from 1 billionth gm. in 100 cc. of solution to 1 ten thousandth gm. in 100 cc. They found that the dry weight of the mycelium of *P. Roqueforti* increased with the increase of selenium, while *P. candidum* produced the greatest dry weight in the solution having 1 ten millionth gm. of Na_2SeO_3 per 100 cc. of nutrient solution. There was also an increase in ash as the dry weight increased, but the 2 were not identical. In all cultures in which selenium was used there was a decrease of phosphorus in the ash even though the total ash content was higher than in the control.—*F. G. Gustafson.*

3498. SEVERY, HAZEL W. The occurrence of copper and zinc in certain marine animals. *Jour. Biol. Chem.* 55: 79–92. 1923.

3499. STEEL, THOMAS. The occurrence of calcium oxalate in the gidgee wattle (*Acacia Cambagei* Baker). *Proc. Linn. Soc. New South Wales* 46: 256–258. 1921.—Indication of unusual quantities of calcium in the ash of gidgee led the author to determine the amount present as calcium oxalate in the timber and bark. Oxalate is calculated as $C_2O_4Ca + H_2O$. The oxalate precipitate obtained was ignited completely and weighed as CaO. In the analysis ash soluble in acid, sand, potash, lime as oxalate, total CaO, calcium oxalate and water were determined. The proportions of calcium oxalate in the bark are the highest known to be recorded for any plant. Barks from 6 other species of *Acacia* were examined. Although varying amounts were found none showed as high a percentage as *A. Cambagei*. A variable amount of lime was present in combination other than oxalate. The bark of *A. decora* contained a comparatively large amount of ash insoluble in acid and was high in iron and alumina.—*Eloise Gerry.*

3500. WALTON, GEORGE PELHAM. Specific acidity of water extract and oxalate content of foliage of African sorrel. *Bot. Gaz.* 74: 158–173. *Fig. 1.* 1922.—A method is described which makes possible the identification of the principal sources of acidity characterizing the water extract of plant tissues. In the case of *Rumex abyssinicus* (African sorrel) it was found that “only two compounds of oxalic acid, potassium binoxalate and calcium oxalate monohydrate, occur in the leaves examined. The percentages in which these salts occur are computed from the data for acidity and total oxalate in the dried material.” Corroboration of results by crystallographic methods was obtained. The writer noted the presence of a natural indicator in the leaves.—*B. W. Wells.*

PHOTOSYNTHESIS

3501. ANONYMOUS. Photosynthesis. *Nature* 110: 856–857. 1922.—Brief notes are given of papers read at a joint meeting of the sections of chemistry and botany at the Hull meeting of the British Association.—*O. A. Stevens.*

3502. BORNEMANN. Die Kohlenstoff-Ernährung der Kulturpflanzen. [The carbon nutrition of cultivated plants.] *Fühlings Landw. Zeitg.* 70: 1–7. 1920.—This constitutes a reply to the criticism by Th. Pfeiffer, Breslau, of recent work by the author, who seeks to maintain

his view that increased production in the open field as well as in an enclosed area is possible through the production of CO₂ in the soil and its consequent diffusion upwards. Reference is made to the author's work "Kohlensäure und Pflanzenwachstum," Berlin, 1920. No new work is reported.—*C. C. Epling.*

METABOLISM (GENERAL)

3503. ANONYMOUS. [Rev. of: SHERMAN, H. C., and S. L. SMITH. *The vitamins.* iii + 273 p. (Amer. Chem. Soc. Monograph Series) Chemical Catalog Co.: New York, 1922 (see Bot. Absts. 12, Entry 3517).] *Nature* 110: 6. 1922.—This book includes a bibliography of the literature to the end of the year 1921.—*O. A. Stevens.*

3504. BAUGHMAN, WALTER F., and GEORGE S. JAMIESON. *The chemical composition of soya bean oil.* Jour. Amer. Chem. Soc. 44: 2947-2952. 1922.—The percentage composition of the different glycerides is as follows: Linolenic acid, 2.3; linolic, 51.5; oleic, 33.4; palmitic, 6.8; stearic, 4.4; arachidic, 0.7; lignoceric, 0.1; also unsaponifiable matter, 0.6 per cent.—*J. M. Brannon.*

3505. BOBILIOFF, W. *Onderzoekingen over het zetmeel van Hevea brasiliensis.* [The starch of *Hevea brasiliensis*.] Arch. Rubbercult. Nederland.-Indië 4: 71-118. 1920.—Starch occurs in the cortex and in the wood of this species, while the cambium contains none. Starch storage in cells surrounding the latex vessels, and its disappearance in the cortex, when the tree is tapped, suggest that there is a close relation between latex formation and starch supply. The large amount of starch normally stored indicates that there need be no fear of depletion of food supply by tapping even during the wintering season.—*C. D. LaRue.*

3506. HARDING, T. SWANN. *The preparation of fructose.* Jour. Amer. Chem. Soc. 44: 1765-1769. 1922.

3507. HENRY, T. A. *The plant alkaloids.* J. & A. Churchill: London, 1922. 21 s. net.

3508. JAMIESON, GEORGE S., and WALTER F. BAUGHMAN. *The chemical composition of sunflower-seed oil.* Jour. Amer. Chem. Soc. 44: 2952-2957. 1922.—The following percentage composition of glycerides is found: Oleic acid, 33.4; linolic, 57.5; palmitic, 3.5; stearic, 2.9; arachidic, 0.6; lignoceric, 0.4; also unsaponifiable matter, 1.2 per cent.—*J. M. Brannon.*

3509. LARSON, L. W., and W. P. LARSON. *Factors governing the fat content of bacteria and the influence of fat on pellicle formation.* Jour. Infect. Diseases 31: 407-415. 1922.—An historical résumé is given of methods in fat extraction, and those used in the present paper are outlined in detail. It is concluded that carbohydrates and glycerol are converted into fat or fat-like substances only when they are not fermented by the organism, and that pellicle formation by bacteria is probably determined by the surface tension of the medium on the one hand and the fat content of the bacteria on the other. The acid-fast staining properties of the tubercle bacillus are thought to be a quality function of fat or other substances present rather than one of quantity. It is further thought that the fat content of the tubercle bacillus bears no relation to pathogenicity, but this content is determined entirely by the action of the organism on the glycerol in the medium.—*R. V. Allison.*

3510. LINK, KARL, PAUL LINK, and W. E. TOTTINGHAM. *Effects of the method of desiccation on the carbohydrates of plant tissues.* Jour. Amer. Chem. Soc. 45: 439-447. 1923.—The tissues used in this work were beet leaves, ears of corn, corn stalks, corn seedlings, and potato tubers. These tissues were all collected on clear days and about noon.—The alcohol method of preserving plants was used as a standard. In this method a convenient quantity of tissue, depending upon the water, was put into enough alcohol to insure a concentration of 75 per cent alcohol after dilution by the water from the tissues. A little calcium carbonate

was added, in order to neutralize any acid which might have been present, and the mixture was heated for 1 hour on a steam bath at 78°.—The results from desiccation show that a temperature of 98° should not be employed for drying tissues when the sugar and starch content are high. A temperature of 65° can be used, in an air current, with tissues that can be dried rapidly. A temperature of 80° in a vacuum is superior to 65° in a vacuum. In the case of the ear of corn a previous heating in an autoclave to inhibit enzyme action is an advantage.—A well ventilated oven which has a large volume of air circulating over the tissues allows a lower drying temperature.—“The alcohol method of preservation gave the same analytical results for carbohydrates as desiccation at 80° in vacuum, in the case of beet leaves and corn ears. The methods are, therefore, equally efficient in checking enzyme action and stopping respiration.”—*J. M. Brannon.*

3511. NOYES, H. A., H. T. KING, and J. H. MARTSOLF. **Variations in the Concord grape during ripening.** Jour. Assoc. Official Agric. Chem. 6: 197-205. 1922.—Ripening Concord grapes vary greatly in composition; this variation can not be correlated with season and date of harvesting. The weight of the individual berry remains fairly constant during ripening, although it tends to increase slightly. The sugar content of the Concord grape and grape juice increases as ripening advances, while the acid content of the juice decreases as ripening advances. Changes in the acid and sugar content of the grape and grape juice are irregular from harvesting date to harvesting date. The tannin and coloring matter content of the grape juice is very irregular. Hot-pressing increases the tannin and coloring matter content of the grape juice.—*F. M. Schertz.*

3512. OELSNER, ALICE. **Die Ergebnisse der letzten Arbeiten von Professor Dr. Alfred Koch - Göttingen.** [The results of the last work of Prof. Dr. Alfred Koch at Göttingen.] Mitteil. Deutsch. Landw. Ges. 37: 497. 1922.—At the time of his death Koch was engaged in studying the effect of certain soil bacteria on organic phosphorus compounds. In this preliminary note it is stated that certain bacteria were found to have the ability to break down the organic phosphorus compounds so that 68.5 per cent of the phosphorus was recovered as inorganic phosphorus, and 31.5 was utilized in the body of the bacteria. The full report will appear in *Biochem. Zeitschr.*—*A. J. Pieters.*

3513. POWER, FREDERICK B., and VICTOR K. CHESTNUT. **Confirmation of the occurrence of linalyl esters in peaches.** (A note). Jour. Amer. Chem. Soc. 44: 2966-2967. 1922.

3514. POWER, FREDERICK B., and VICTOR K. CHESTNUT. **The odorous constituents of apples. 2. Evidence of the presence of geraniol.** Jour. Amer. Chem. Soc. 44: 2938-2942. 1922.—The odorous constituents of the apple consist chiefly of amyl esters. The distinctly core-like odor is due to the presence of the aliphatic terpene alcohol geraniol, which is present either in the free form or as an ester.—*J. M. Brannon.*

3515. POWER, FREDERICK B., and VICTOR K. CHESTNUT. **The odorous constituents of peaches.** Jour. Amer. Chem. Soc. 43: 1725-1738. 1921.—The odorous constituents of the peach are chiefly linalyl esters of formic, acetic, valeric, and caprylic acids. There is also a considerable portion of acetaldehyde and a small amount of higher aldehydes. Some volatile acids are also present.—*J. M. Brannon.*

3516. QUISUMBING, F. A., and A. W. THOMAS. **Conditions affecting the quantitative determination of reducing sugars by Fehling's solution. Elimination of certain errors involved in current methods.** Jour. Amer. Chem. Soc. 43: 1053-1526. 1921.

3517. SHERMAN, H. C., and S. L. SMITH. **The vitamins.** Amer. Chem. Soc. Monogr. 6. 270 p. 1922.—This volume includes a brief history of the vitamine theory; a discussion of the physical, chemical and physiological properties of the 3 vitamins; a consideration of their place in the diet and their occurrence in the common foods; and an extensive bibliography. [See also Bot. Absts. 12, Entry 3503.]—*Mildred L. Johnson.*

3518. STEEL, THOS. **Chemical Notes.**—Botanical. Proc. Linnean Soc. New South Wales 46: 487-491. 1921.—Analytical data are given of the following: (1) some Australian fruits, *Eupomatia laurina* R. Br., *Ficus macrophylla* Desf., *F. Cunninghamii* Miq., *F. rubiginosa* Desf., *Podocarpus elata* R. Br., (2) Fijian wild sugar cane; (3) roots of the dragon tree, *Cordyline terminalis*; (4) calcium carbonate in wood of *Geissois Benthani* (F. v. M.) (with flinty deposit); (5) the nitrogen content of the following fungi by the Kjeldahl-Gunning method,—*Peziza fasciculosa*, *Stereum caperatum*, *S. lobatum*, *Polyporus mylittae*, *P. portentosus*, *Hexagona subtenuis*, *Hexagona* sp., *Lenzites repandra*, *Polystictus flabelliformis*, *P. sanguineus*, *Trametes Muelleri*, *T. lactinea*, *Clathrus cibarius*, *Xylostroma giganteum* (sterile mycelium of several Polyporaceae, chiefly *P. eucalyptorum* and a species of *Fomes*); and (6) the exudation (mannitol, etc.) from *Myoporum platycarpum* R. Br.—*Eloise Gerry*.

3519. VÖLTZ, W., W. DIETRICH, und A. DEUTSCHLAND. **Die Verdaulichkeit und Verwertung der Nährstoffe des Ölpilzes (*Endomyces vernalis* Ludwig) durch Carnivoren und Herbivoren (Wiederkauer).** [The digestibility and nutritive value of *Endomyces vernalis* Ludwig to carnivores and herbivores (ruminants).] Biochem. Zeitschr. 114: 111-128. 1921.—The writers found that the fatty fungus *Endomyces vernalis* could be digested and would serve as a nutriment to the dog and sheep. They found that from 58 to 85 per cent of the fat from the fungus was reabsorbed by the dog, while only 64 per cent of the protein was available to either animal.—*F. G. Gustafson*.

METABOLISM (NITROGEN RELATIONS)

3520. GORTNER, ROSS AIKEN, and EARL R. NORRIS. **The origin of the humin formed by the acid hydrolysis of proteins. 7. Hydrolysis in the presence of ketones.** Jour. Amer. Chem. Soc. 45: 550-554. 1923.

3521. JOHNSON, H. W., and C. B. LIPMAN. **The effect of reaction on the fixation of nitrogen by *Azotobacter*.** Univ. California Publ. Agric. Sci. 4: 397-405. 3 fig. 1922.—These are observations on the fixation of nitrogen by *A. chroococcum* grown in solutions of known reactions. The nitrogen fixed in the solutions of each reaction was determined and the changes in reaction during incubation were measured. It was found that the reaction of solutions below pH 8.0 changed very little, because no growth occurred below pH 6.0, and because the solutions in the region between 6.0 and 8.0 were highly buffered. The amount of nitrogen fixed was not greatly affected by reactions between pH values of 6.2 and 8.8, although reactions around pH 7.0 and 8.0 seemed to be most favorable. Slight changes outside of these values caused an abrupt decrease in fixation. The work shows that no nitrogen fixation by *Azotobacter* may be expected in many soils, since it has repeatedly been shown that pH values below 6.0 are frequently encountered.—*H. S. Reed*.

3522. JOHNSON, T. B., and E. B. BROWN. **The preparation of nucleic acid from the nucleoprotein of tubercle bacilli (tuberculinic acid).** Jour. Biol. Chem. 54: 721-730. 1922.—A nucleic acid has been obtained from tubercle bacilli (human and bovine), and the name tuberculinic acid has been given to it.—*G. B. Rigg*.

3523. JOHNSON, T. B., and E. B. BROWN. **The pyrimidines contained in tuberculinic acid, the nucleic acid of tubercle bacilli.** Jour. Biol. Chem. 54: 731-737. 1922.—Cytosine and thymine have been separated from this acid and identified.—*G. B. Rigg*.

3524. LEVENE, P. A. **Hydrolysis of yeast nucleic acid with dilute alkali at room temperature (Conditions of Steudel and Peiser).** Jour. Biol. Chem. 55: 9-13. 1923.—Former work by the author indicating that yeast nucleic acid is a tetranucleotide, in which the individual nucleotides are linked to one another in ester form, is confirmed.—*G. B. Rigg*.

3525. RUSS, V. K., und E. OESTERLIN. **Studien über die Phyto-Hämagglutinine.** [Phytohaemoglutinine.] Biochem. Zeitschr. 114: 258-276. 1921.—The results described in this

paper indicate that in soy beans, lentils, peas, and white beans there is a substance which agglutinizes the blood of man, dog, and guinea pig but not the blood of the horse, sheep, goat, rat, and mouse. This haemoglutinine was extracted with various concentrations of NaCl. It is only slightly thermolabile, can be precipitated by $(\text{NH}_4)_2\text{SO}_4$ and alcohol, cannot be extracted with ether together with oil, and is found only in the seeds.—*F. G. Gustafson.*

3526. SHOWALTER, M. F., and R. H. CARR. Characteristic proteins in high and low protein corn. *Jour. Amer. Chem. Soc.* 44: 2019-2023. 1922.

3527. WOODMAN, HERBERT ERNEST. The chemistry of the strength of wheat flour. *Jour. Agric. Sci.* 12: 231-243. 1922.—Previous work on the gliadin and glutenin of weak and strong flours pointed to the identical chemical nature of these compounds in the 2 types of flour, but more recent work has indicated that 2 proteins may be quantitatively identical with regard to their amino-acid content and yet be 2 distinct proteins, by virtue of differences in the order of linkage of the amino-acids within the protein molecule. The racemisation method recently used in the investigation of proteins of blood serum, colostrum, and milk was utilized to determine whether or not the proteins mentioned above are identical. This method depends on the behavior of proteins in dilute alkaline solution. Such solutions kept at 37°C. suffer a progressive diminution in the value of their optical rotatory power. If the specific rotations are plotted against the time in hours during which the reaction is allowed to proceed, then the readings fall on a perfectly smooth curve. Since individual proteins display specific behavior quantitatively when racemized with dilute soda, this method may be used to test the identity or non-identity of two compounds.—By the method described above and by (1) determining the identity of their specific rotations in 70 per cent alcohol, and (2) by determining the identity of their combining capacities for alkali, by titration, the gliadins of weak and strong flour are shown to be identical, while by the racemisation method their glutenins are shown to be 2 distinct substances. The results of this experiment indicate that strong wheat synthesizes one type of glutenin and weak wheat a different type, while wheats of intermediate strength may contain varying proportions of the 2 glutenins.—*V. H. Young.*

METABOLISM (ENZYMES, FERMENTATION)

3528. CONN, H. J. Fermentation and preservation of manure. (Abstract.) *Absts. Bact.* 6: 484. 1922.

3529. CORRAN, J. W., and W. C. M. LEWIS. The effect of sucrose on the activities of the chloride and hydrogen ion. *Jour. Amer. Chem. Soc.* 44: 1673-1765. 1922.

3530. DENNY, F. E. Methods for the estimation of small amounts of starch in plant tissues. *Jour. Assoc. Official Agric. Chem.* 6: 175-191. 1922.—Of the 3 methods found to be most suitable, the absorbed-iodine method is the most convenient, as results are obtained by it in the shortest time. The reduction method (using the Scales modification) gave promise of being improved to give greater sensitiveness, since the range from 0 to 1 per cent can be split up into more distinct steps by means of it than by the others. The residual iodine method also exhibits possibilities. The methods described, applied to cantaloupe seed powders, cover a range of 0 to 1 per cent starch by steps of about 0.1 per cent. The principal method used consisted essentially in dissolving the starch in concentrated CaCl_2 solution, precipitating the starch under a standard set of conditions, titrating the iodine taken up by the starch, and comparing the values thus obtained with those given by known amounts of starch under the same conditions. Detailed descriptions of the methods are given together with results obtained by their use. The methods are recommended only for tissues containing small amounts of starch.—*F. M. Schertz.*

3531. EULER, H. V., I. LAURIN, and A. PETTERSON. Anpassung einer Oberhete an das Gärsubstrat Galaktose. [Adaptation of top yeast to the substrate galactose.] *Biochem. Zeitschr.* 114: 277-291. 1921.—The writers found that under normal conditions top yeast SB

II fermented cane sugar 50 times faster than galactose. The addition of a water extract of dried yeast increased the rate of galactose fermentation several fold. Seemingly the yeast extract served as an activator or co-enzyme to the zymase. By treating the yeast with a 2 per cent galactose solution for several days it was adapted to the galactose, and the rate of fermentation of the latter was increased 7 times, so that the ratio of galactose fermentation to that of cane sugar was 1: 6.5 instead of 1: 50.—*F. G. Gustafson.*

3532. FALK, K. G., and GRACE MCGUIRE. **Studies on enzyme action. XXI. Banana gel and banana sucrase.** Jour. Biol. Chem. 54: 655-669. 1922.—Results are reported on the relation between gel formation and sucrase content of extracts from banana pulp, obtained by means of solutions of NaCl and of other salts; also the sucrase content of the gel and of the solution, with the gel prepared by the action of pancreatin on banana pulp extract, and the separation of the gel substance and the sucrase substance by various treatments.—Gel formation decreased with increase in NaCl concentration in the extracting liquids. Solutions of NaCl and of other salts extracted more sucrase than did water alone. It is concluded, mainly on this basis, that the gel-forming property and the sucrase-forming property of the banana are due to different substances. Both properties are destroyed by boiling the solutions.—It is concluded that a definite enzyme property is not a soluble molecule or an insoluble molecule as such, but that the simplest chemical interpretation is that enzyme action is due to certain groupings present at one time with soluble and at another time with insoluble material.—*G. B. Rigg.*

3533. FENGER, FREDERIC. **A comparison between the chemical and physiological characteristics of pepsin and rennin.** Jour. Amer. Chem. Soc. 45: 249-255. 1923.—The properties of pepsin and rennin are different. Pepsin is coagulated by heat and is colloidal in nature. Rennin is a decomposition product of protein of the acid albumin type. It is not coagulated by boiling. "The former may be dialyzed, while the latter diffuses readily through parchment membranes." "Proteolytic or peptic activity does not seem to be a part of the true physiological characteristics of the milk-curdling enzyme."—*J. M. Brannon.*

3534. HAHN, A. **Über den Einfluss neutraler Alkalisalze auf diastatische Fermente. 4 Mitteilung.** [Influence of neutral salts on amylolytic enzymes. 4.] Zeitschr. Biol. 74: 217-228. 1922.—This is a summary of 3 previous papers [see Bot. Absts. 12, Entries 3535, 3536, 3537.] Certain new data are also given and the bearing of these results on the possible nature of enzymatic action is discussed. Ptyalin, diastase, and amylopsin can be precipitated at certain H-ion concentrations and can again be dissolved in HCl. Increasing or decreasing the H-ion concentration in reference to the precipitation optimum reduces the precipitation. The precipitation optimum for diastase in an acetate-tartaric acid solution is pH 3.63. All of the salts used have a protective effect against precipitation and accelerate activity in dilute concentrations of the buffers; at higher concentrations of the buffer the chlorides have the same effect, but the sulphates and nitrates have the opposite effect at H-ion concentration higher than the optimum. Sodium and potassium salts were tested. The optimum H-ion concentration for the action of ptyalin in phosphate and acetate buffer solutions is pH 6.4 and 5.6, respectively; for amylopsin pH 7.1 and 5.5, respectively; for diastase in acetate, pH 4.7. These results are comparable with the effect of certain salts and H-ion concentrations on colloids and seem to indicate that the effect of neutral salts on the activity of enzymes may be due to their action in decreasing, or increasing the total area of the colloidal enzyme solution.—*C. H. Arndt.*

3535. HAHN, A., und K. HARPUDE. **Über den Einfluss neutraler Alkalisalze auf diastatische Fermente. 1 Mitteilung.** [Influence of neutral salts on amylolytic enzymes. 1.] Zeitschr. Biol. 71: 287-301. 1920.—Data are given to show that salts may either inhibit, or accelerate, the activity of diastase and ptyalin. The particular effect is dependent upon the concentration and anion of the salt, the concentration and nature of the buffer, and the H-ion concentration of the solution.—*C. H. Arndt.*

3536. HAHN, A., und K. HARPUDE. Über den Einfluss neutraler Alkalisalze auf diastatische Fermente. 2 Mitteilung. [Influence of neutral salts on amylolytic enzymes. 2.] Zeitschr. Biol. 71: 302-310. 1920.—The authors were unable to find any evident relationship between the isoelectric point of the enzyme, as determined by its migration in an electric current, and its activity. The isoelectric point may lie either on the alkaline or the acid side of the optimum H-ion concentration.—C. H. Arndt.

3537. HAHN, A., und R. MICHALIK. Über den Einfluss neutraler Alkalisalze auf diastatische Fermente. 3 Mitteilung. [Influence of neutral salts on amylolytic enzymes. 3.] Zeitschr. Biol. 71: 10-18. 1921.—Neutral salts have the same effect on amylase as they had on ptyalin and diastase in the previously reported experiments. All 3 enzymes can be precipitated from solution at certain H-ion concentrations. The precipitation may be increased or decreased by the addition of the proper salt [see Bot. Absts. 12, Entry 3534].—C. H. Arndt.

3538. HOWARD, J. W. The enzyme hydrolysis of benzyl succinate. Jour. Amer. Chem. Soc. 44: 1763-1765. 1922.

3539. NELSON, J. M., and DAVID I. HITCHCOCK. The activity of adsorbed invertase. Jour. Amer. Chem. Soc. 43: 1956-1961. 1921.

3540. SHERMAN H. C., and MARY L. CALDWELL. Influence of amino acids in protecting amylase from inactivation by mercury. Jour. Amer. Chem. Soc. 44: 2923-2926. 1922.—The authors find that glycine and phenylalanine protect pancreatic amylase against small amounts of mercuric chloride.—J. M. Brannon.

3541. SHERMAN, H. C., and MARY L. CALDWELL. Influence of lysine upon the hydrolysis of starch by purified pancreatic amylase. Jour. Amer. Chem. Soc. 44: 2926-2930. 1922.—Lysine shows no effect upon the amylolytic action of pancreatic amylase, but exerts a favorable influence upon its saccharogenic action. Amylase, according to the authors' view, is protein in nature, and through hydrolysis it becomes inactivated. The presence of amino acids retards this hydrolysis. But lysine is not split off until after the amylolytic action has taken place and so does not exert its influence until after that stage.—J. M. Brannon.

3542. SHERMAN, H. C., and NELLIE M. NAYLOR. Influence of some organic compounds upon the hydrolysis of starch by salivary and pancreatic amylases. Jour. Amer. Chem. Soc. 44: 2957-2966. 1922.

3543. VOSBURGH, WARREN C. Some errors in the study of invertase action. Jour. Amer. Chem. Soc. 43: 1688-1693. 1921.—Invertase secretions are subject to loss in activity when diluted with distilled water. There is less loss when diluted with weak acids. Sucrose protects invertase from loss of activity. Sucrose is hydrolyzed by invertase faster when citrate buffer or acetate buffer is used as a source of the hydrogen ion than when either citric acid or acetic acid is used. Different invertase preparations vary in the magnitude of their losses on dilution.—J. M. Brannon.

3544. WALLACE, R. HEDGER. Vegetable rennet. Nature 110: 543. 1920.—A preliminary list of plants which have been used in place of rennet for the coagulation of milk is presented. The list includes: *Galium verum*, *Withania coagulans*, *Ficus Carica*, *Cynara cardunculus*, *Cynara scolymus*, *Carduus nutans*, *Cnicus benedictus*, *Drosera peltata*, *Datura Stramonium*, *Pisum sativum*, *Lupinus hirsutus*, *Ricinus hirsutus*, *Pinguicula vulgaris*, *Leucas cephalotes*, *Crotalaria Burhia*, *Rhazya stricta* and *Streblus asper*.—O. A. Stevens.

METABOLISM (RESPIRATION)

3545. PARKER, G. H. The calibration of the Osterhout respiratory apparatus for absolute quantities of carbon dioxide. Jour. Gen. Physiol. 4: 689-695. Fig. 1. 1922.—A method is given whereby minute absolute amounts of CO₂ may be measured by using the Osterhout

respiratory apparatus. Each particular apparatus must be calibrated since it has its own constant, but once this is done a formula, viz., $K = T \times W$, where K is the constant for the particular apparatus, T the time in seconds for change of indicator from one pH to another, and W the weight of CO_2 in hundred-thousandths mg. delivered per second. The expression may be stated thus, $\frac{K}{T} = W$.—O. L. Inman.

3546. PARKER, G. H. The excretion of CO_2 by relaxed and contracted sea anemones. Jour. Gen. Physiol. 5: 45-63. Fig. 1. 1922.—The metabolism of the sea anemone *Metridium marginatum*, as measured by the output of CO_2 in hundred-thousandths mg. per second by a gm. of living sea anemone showed that during the contracted state, the relaxed state, and the relaxing state, equivalent amounts of CO_2 were liberated, but that during the state of contraction there was an increase of CO_2 output, or increased metabolism. This has a direct bearing on the nature of the metabolic processes going on during a state of contraction, which state may be maintained for a long time in sea anemones and in some molluscs. A theoretical discussion of the relationship between tonus and tetanus is given.—O. L. Inman.

3547. RICHARDSON, A. C., and C. C. DOZLER. A safe method for securing anaerobiosis with hydrogen. IX. Jour. Infect. Diseases 31: 616-621. 1922.—A method whereby anaerobiosis with hydrogen is obtained with minimum risk to the operator is described in detail.—R. V. Allison.

3548. ROCKWELL, GEORGE E. The influence of carbon dioxide on the growth of bacteria. Jour. Infect. Diseases 32: 98-104. 1923.—It is pointed out that many, if not all obligatory aerobes are not obligatory, but may grow in the absence of oxygen provided the proper carbon dioxide tension is supplied. It is further noted that anaerobicity is concerned not only with the absence of oxygen but with the presence of carbon dioxide in practically all cases. Interesting studies are also presented upon partial tension strains and particularly the relation of the concentration of these 2 gases in the case of those cultures recently isolated from the host.—R. V. Allison.

3549. WOODMAN, HERBERT ERNEST. Comparative determinations of the digestibility and metabolisable energy of green oats and tares, oat and tare hay and oat and tare silage. Jour. Agric. Sci. 12: 144-165. 1922.—Tables of physiological interest are given.—V. H. Young.

ORGANISM AS A WHOLE

3550. DUFRÉNOY, J., et R. MOLINÉRY. Les sulfuraires. [Sulphur bacteria.] Presse thermale et climatique 63: 478-480. Fig. 1. 1922.—In the thermal springs of the Pyrenees (Barèges and Luchon) microscopic sulphur crystals form in the layer of sulphur bacteria floating on the water, while sulphur granules form inside the cells of *Thiothrix*. Sulphur formation is most active at temperatures of 40-50°C.—J. Dufrénoy.

3551. FARR, CLIFFORD H. The psychology of plants. Atlantic Monthly 130: 775-783. 1922.

3552. GREIG-SMITH, R. The high temperature organism of fermenting tan-bark. Proc. Linn. Soc. New South Wales 46: 76-98. 4 figs. 1921.—The fermentation of spent wattle-bark in the corrosion of white lead by the old Dutch process was caused by a stout rod-shaped bacterium having a terminal spore. Its optimum laboratory temperature was 60°C., although in the corroding stacks the temperature might rise to 80°. Raw spent wattle-bark was difficult to ferment and required preliminary treatment or "tempering," that is, the maintenance of a vigorous growth of active bacteria. As conditions which oxidise tannin substances favor fermentation of the raw bark, it is probable that residual tannins inhibit fermentation. During the corrosion process there was a comparatively slow and prolonged evolution of CO_2 , due mainly to bacteriological fermentation, the speed of which seemed to be regulated by

small amounts of nitrogenous matter in the bark. This conclusion was confirmed by experiments showing the influence of asparagin. The organism was found to be capable of decomposing sugar, such as dextrose or saccharose, when freshly isolated, but soon thereafter it required the addition of alkali to enable it to act. The spores were difficult to destroy, especially when in the pores of the bark; they lived after exposure to 186–205° for 2½ hours. It was not proved that the bacteria could ferment cellulose. There was no growth of the organism in media devoid of soluble sources of carbon, such as Uschinsky's solution. The constituent of the bark fermented is still unknown.—*Eloise Gerry.*

3553. HARLAN, HARRY V., and MERRITT N. POPE. **The germination of barley seeds harvested at different stages of growth.** Jour. Heredity 13: 72–74. 1 fig. 1922.—Barley kernels at Aberdeen normally mature about 26 days after flowering. The diastase which digests the starch endosperm is secreted by the epithelial layer of the scutellum. This layer assumes its form about the 14th day after flowering. Hand pollinated kernels germinated 5 days after flowering, when the entire kernel contained only 5 mgm. of dry matter. The mature kernel contains about 35 mgm. dry matter. All seeds that germinated produced normal plants.—*H. V. Harlan.*

3554. HEARN, GEO. D. **Relation of sunlight to plant development.** [Rev. of: GARNER, W. W., and H. A. ALLARD. **Effect of the relative length of day and night and other factors of the environment on growth and reproduction in plants.** Jour. Agr. Res. 18: 553–606. 1920 (see Bot. Absts. 5, Entry 22).] Monthly Weather Rev. 50: 423–424. 1922.

3555. KÜSTER, E. **Botanische Betrachtungen über Alter und Tod.** [Botanical observations on senescence and death.] Abhandl. Theoret. Biol. [Edited by JULIUS SCHAXEL.] 10: 1–44. 1921.—This paper represents some conclusions that are based on the observations of various authors from Pliny to the present time as to the facts of senescence and death in plants. The paper serves as an introduction to the many aspects of the literature, especially the more recent publications.—*C. C. Epling.*

3556. LOPEZ Y NEGRIN, J. **Die Anaphylaxie.** Authorized translation by C. RICHET *iv* + 221 p. Akademische Verlagsgesellschaft m. b. H.: Leipzig, 1920.

3557. MEGRAIL, EMERSON. **Factors influencing development of metachromatic granules in the diphtheria bacillus.** Jour. Infect. Diseases 31: 393–401. 1922.—Granule production in the diphtheria bacillus shows marks variation in response to the different media used. The influence of single versus confluent colonies as the source of smears as well as the effect of products of growth upon old as compared to young cultures were considered. The influence of temperature, water content of the substratum, oxygen pressure, and the presence of diphtheria toxin and toxin-antitoxin are also discussed.—*R. V. Allison.*

3558. REXHAUSEN, LUDWIG. **Über die Bedeutung der ektotrophen Mykorrhiza für die höheren Pflanzen.** [On the importance of ectotrophic mycorrhiza for higher plants.] Beiträge Biol. Pflanzen 14: 18–59. Pl. I–III, fig. 1–4. 1920.—By the use of microchemical tests and cultural studies with the mycorrhiza of *Picea* the writer sought to determine whether the ectotrophic mycorrhiza are parasitic or symbiotic in nature. He found that under certain conditions of culture the mycorrhiza fungi may be parasitic while under other conditions they may supply the roots with phosphorus and potassium as well as perhaps nitrogen and so may properly be regarded as beneficial to the host plant to a degree at least. The protective devices developed (tannin, certain wall thickenings) by the host against invasion by the fungus are considered. Text figures show the distribution of various chemicals in the roots under different conditions of culture. In his studies of the relation of *Monotropa* to the host fungus he finds that the fungus, by means of haustoria, does take certain substances (proteins and perhaps sugar) from the epidermis of the host. On the other hand, he is convinced, though no certain proof is available, that the epidermal cells do absorb the contents of dying hyphae

of the fungus.—Germination experiments with seeds of *Monotropa* have not been successful because of the necessity of the presence of the proper fungus and the difficulty of eliminating from the cultures other fungi which suppress the activity of the true fungus.—Orton L. Clark.

3559. TANNER, FRED W. **Microbiology of flax retting.** Bot. Gaz. 74: 174–185. 1922.—*Clostridium amylobacter* was isolated as the specific organism of retting flax. It is an anaerobic, spore-forming bacterium commonly present on flax stalks and widely distributed in nature. It hydrolyzes rapidly the carbohydrate “binders” in the flax stalk. The time interval was no less, and the action no more effective when the anaerobic *Clostridium* was associated with aerobic forms. Temperature is an important factor, the optimum being about 30°C. Shortening of the retting process and a better quality of fiber are produced by utilizing controlled conditions with an optimum environment. “Previous sterilization of the flax did not seem to affect the retting process. No real success was secured by the use of 15 common aerobic bacteria and 5 yeast-like fungi. Flax raised from seed was quickly retted, although the fiber was not in as good condition as that prepared from flax raised for fiber.”—B. W. Wells.

3560. WILSON, J. K. **The growth of soil bacteria in guttation water.** (Abstract.) Absts. Bact. 6: 484. 1922.—*Bacillus cereus*, *B. fluorescens*, *B. radiciola* and 2 unnamed species grew abundantly in sterilized guttation water.—D. Reddick.

GROWTH, DEVELOPMENT

3561. MASON, T. G. **Growth and abscission in sea island cotton.** Ann. Bot. 36: 457–484. 10 fig. 1922.—The factors responsible for the premature shedding of flower buds and bolls were studied. It is shown that the susceptibility to shedding is very small until growth in the main axis has nearly ceased. It is concluded that both cessation of growth and increased susceptibility to shedding are due to the diversion of food to the large number of more mature bolls on the lower part of the plant. This conclusion is supported by the fact that the removal of the more mature bolls lessens the shedding. In general it is believed that the amount of shedding is determined by the rate at which food is manufactured and by the rate at which it is used up, and that consequently any factor which causes a decrease in food manufacture causes an increase in shedding. In agreement with this it was found that shedding increased after the removal of leaves, daytime rain, lack of direct sunlight, etc.—W. P. Thompson.

3562. PRIESTLY, J. H., and W. H. PEARSALL. **Growth studies, III. A “volumometer” method of measuring the growth of roots.** Ann. Bot. 36: 485–489. 1 fig. 1922.—An account is given of an apparatus which is designed to measure the whole root system of a plant at intervals during an extended period. The roots are grown in a container to which the nutrient solution is admitted and from which it is removed through a tap at the bottom. Changes in volume of solution in successive readings give the increases in volume of the root system. There are many devices to secure accuracy and convenience in use.—W. P. Thompson.

TEMPERATURE RELATIONS

3563. ESTY, J. RUSSELL. **The heat resistance of *B. botulinus* spores.** Amer. Jour. Public Health 13: 108–113. 1923.—The heat resistance of spores of 112 strains of *B. botulinus* from various sources, including 81 Type A, 30 Type B, and 1 non-toxic, varies from 3 to 75 minutes at 105°C. In general, spores of Type A are more resistant than those of Type B. The maximum heat resistance of spores produced under optimum conditions of growth is 330 minutes at 100°C; 110 at 105°C; 33 at 110°C; 11 at 115°C; and 4 at 120°C. when heated in a phosphate solution of pH 7.0. These figures represent the shortest time at which no spores survived. The longest survival times under the same conditions mentioned above are 320, 100, 30, 10, and 4 minutes respectively. The resistance of different strains varies irrespective of the numbers of spores produced in the same medium; but the resistance of a given strain is markedly influenced by the number of spores heated, the larger the number in a suspension the greater the resistance.—C. A. Ludwig.

3564. ESTY, J. R., and K. F. MEYER. **The heat resistance of the spores of *B. botulinus* and allied anaerobes.** Jour. Infect. Diseases 31: 650-663. 1922.—The specific resistance to heat of the spores of a large number of strains from each of several different varieties of anaerobes was determined under varying conditions. It is thought that young spores, probably those of the first generation, are the most resistant to heat. Among other important observations it was noted that increasing the concentration of the solution up to a certain limit or, under other conditions, the dryness of the spores tended to increase the resistance to heat. Likewise, the thermal resistance of *B. botulinus* was found to be affected by the H-ion concentration of the solutions.—R. V. Allison.

3565. HUBERT, ERNEST E. **A simple apparatus for controlling temperatures.** Bot. Gaz. 74: 333-334. Fig. 1. 1922.—This electrically operated apparatus may be connected with an ordinary lighting circuit. Its main advantage according to the author "lies in the fact that the same current which passes through the heating units is used, after reducing the voltage to 6, 8 or 14 volts, to operate the relay." It is sensitive to within $\frac{1}{4}$ degree.—B. W. Wells.

3566. JOHNSTON, EARL S. **Moisture content of peach buds in relation to temperature evaluations.** Bot. Gaz. 74: 314-319. Fig. 1-2. 1922.—For 3 years from Jan. to March, data were obtained as follows: Ratio of water content to dry weight of buds; temperature indices summed from Jan. 1. The author presents graphs which bring out the definite relationship between air temperature and the rate of increase in the moisture content of peach fruit buds. The slope of the curve for 1 year was quite different from those of the other 2. The writer suggests that "some conditioning influences are at work before Jan. 1 that determine the slopes of these curves."—B. W. Wells.

3567. NEWTON, ROBERT. **A comparative study of winter wheat varieties with special reference to winter-killing.** Jour. Agric. Sci. 12: 1-19. Tables I-VI. 1922.—After reviewing work on the injury to plants from freezing and on the internal factors making for hardiness in plants, the author describes methods of work and results in an attempt to establish a chemical or physico-chemical measurement for winter wheat varieties. Studies were made of the physical constants of the cell sap and the content of dry matter, nitrogen, sugars, and starch. No constant relation was found between depression of the freezing point, specific conductivity, or H-ion concentration of the cell sap and relative frost hardiness. An attempt was made to differentiate between osmotic pressure due to electrolytes and that due to sugars. The latter accounted for 34 to 38 per cent of the total osmotic pressure of the sap. The ratio of that part of the osmotic pressure not due to sugars (designated P-Ps) to the corrected specific conductivity ($\times 10^3$) is not a constant, for this ratio varied from 0.96 to 1.07 in samples collected early in November and varied from 0.73 to 0.91 in samples collected December 9. The relation between dry matter and hardiness was not constant though 1 of the 2 tender varieties had the lowest percentage. All varieties increased in amino nitrogen and water-soluble nitrogen during the hardening process. The hardest variety had the largest content of water-soluble nitrogen, but the relation was not uniform throughout the series. The amount of sugar present did not correspond uniformly with the known hardiness and decreased from Nov. to Dec., the greatest decrease being in one of the two tender varieties. Sucrose is important as a storage product and is apparently the only disaccharid present. No starch was present in any of the varieties. The colloidal complex of fully hardened tissue was very resistant to freezing and could not be broken down by a freezing mixture with a theoretical temperature of -59.9°C . Such hardened tissues retain their water with great force. No appreciable amount of sap could be extracted under a pressure of 400 atmospheres though the tissues contained 70 per cent of moisture and were subjected to severe preliminary freezing.—V. H. Young.

TOXIC ACTION

3568. ATWOOD, W. M. **Physiological studies of the effects of formaldehyde on wheat.** Bot. Gaz. 74: 233-263. Fig. 1-12. 1922.—Formaldehyde slowly penetrates the seed coat. Within the germinating seed it reduces the diastatic activity, inhibits the function of the

catalases, and lessens respiration. The author suggests that "it is entirely possible that concentrations which do not materially injure germination percentages do materially disturb the physiological processes related to germination and subsequent growth." Regarding concentration, he indicates that the common 1-320 formula may be injurious through reduction of seedling vitality in the presence of germination. [See also Bot. Absts. 9, Entry 1044.]—*B. W. Wells.*

3569. OLDENBUSCH, CARRIE. Stimulation of plants by carbon disulphide. Bull. Torrey Bot. Club 49: 375-389. 1922.—Studies made on seeds and seedlings, on buds and certain fungi, showed the ability of carbon disulphide to stimulate when used in dilute amounts. Such was the case in dormant protoplasm of twigs, which quickly resumed growth; in active protoplasm of twigs, which quickly resumed growth; in active protoplasm of seedlings, which elongated more rapidly; and in conidia which germinated sooner and elongated more rapidly. This acceleration lasts for only a certain period and growth then tends to return to normal.—*P. A. Munz.*

3570. WILLIAMS, MAUD. On the influence of immersion in certain electrolytes upon cells of *Saxifraga umbrosa*. Ann. Bot. 36: 569-578. 3 fig. 1922.—The author uses the precipitation of the tannin within the cells by means of potassium dichromate as a criterion of the toxicity of electrolytes. This reaction can occur only after the tissue has been immersed in a given concentration of salt solution for a definite length of time. Beside potassium dichromate 6 salts are used: the chlorides, iodides, and nitrates of sodium and potassium. In her curves, the author plots $\log T$ against $\log C + 1$, where T is the "critical time" and C is concentration, and obtains straight lines. The equation here is: $\log T + k (\log C + 1) = K$. According to the results, different "monovalent cations and similar anions produce different effects while marked differences occur if the cation be kept constant and the anion varied, so that simple chemical action does not seem to explain the changes produced." The author therefore regards the results as due to adsorption and the precipitation of colloids.—*S. F. Cook.*

MISCELLANEOUS

3571. GREIG SMITH, R. Note upon the extraction of acids from cultures. Proc. Linn. Soc. New South Wales 46: 154-156. 1921.—The extraction of the fixed acids from bacterial or from yeast cultures is of the nature of a monomolecular reaction and should be continued until no more acid is extracted. The preparation of salts, such as those of barium, by neutralising the extracted acids until a pink color is obtained in the presence of phenolphthalein, may be faulty as the reaction is much slower than is generally supposed.—*Eloise Gerry.*

3572. LEWIS, J. M. The estimation of acidity. Proc. Roy. Soc. Victoria 33: 233-260. 11 fig. 1921.—The use of the electrometric method is discussed in detail.—*Eloise Gerry.*

3573. MINOT, A. S. Lead studies. II. A critical note on the electrolytic determination of lead in biological material. Jour. Biol. Chem. 55: 1-8. 1923.

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 2901, 2904, 2905, 2914, 2923, 2932, 2933, 2934, 2937, 2939, 2940, 2945, 2948, 2950, 2953, 2958, 2959, 2960, 2974, 3003, 3004, 3040, 3071, 3521)

3574. BORLASE, W., and ALEXANDER GREGG. The agricultural value of sea-sand. Jour. Ministry Agric. Great Britain 29: 591-599. 1922.—The dune and beach sands of Cornwall contain much calcium carbonate from the shells of the several species of mollusks abundant

on that coast. For centuries the Cornish farmers have carried the sand inland, and it is today in strong competition with burnt lime and ground limestone as a source of lime. Analysis of sands from 34 localities shows 22-950 pounds of CaO per ton, 19 of the samples analyzing more than 25 per cent CaO. There was no correlation between fineness and lime content. Experiments by the Cornwall County Council and the experience of individual farmers have demonstrated that these sands are at least as beneficial as commercial forms of lime to clover and grass, although like other forms of lime they may be deleterious to oats and mangolds. Since the soils of Cornwall are generally acid and purchased lime must be brought from South Devon or Somerset, the deposits of sea-sand are of great importance. An examination of the immense quantities of blown sand found elsewhere along the English coast is suggested.—*L. W. Kephart.*

3575. BOVING, P. A. **Soil microbiology—A résumé and an appeal.** *Sci. Agric.* 3: 75-78. 1922.—The writer discusses microorganisms and their relation to soil fertility.—*T. G. Major.*

3576. BROWN, H. D., and F. A. DALLYN. **Report on the fertilizer value of activated sludge.** *Ann. Rept. Provincial Bd. Health, Ontario, Canada.* 39: 130-155. 1920.—The activated sludge process, developed in the past 5 years, is the most promising method of converting urban sewage into a usable nitrogenous fertilizer. It is estimated 1,000 pounds of sludge can be recovered per million gallons of sewage and that approximately 15.4 per cent of the total available nitrogen in the sewage may be recovered as fertilizer base. From data on world production and costs of synthetic and non-synthetic ammoniates and from the known limitations of the former, it is concluded that there is a large prospective market for this material.—In the experimental work activated sludge was prepared by oxidizing the organic material of the raw sewage under aeration with a sludge culture, allowing the liquid to settle and drying and grinding the precipitate. A grayish powdery substance resulted which was quite inoffensive in odor and containing 4.5 per cent nitrogen. It was compared in fertilizing value with cyanamide, dried blood, sodium nitrate, ammonium sulphate, and tankage. Three series of plots were used receiving respectively 40, 80, and 120 pounds of nitrogen per acre in each of the above 6 forms, and 200 pounds each of superphosphates and potassium chloride. The indices used were flax, potatoes, peas, beans, tomatoes, cauliflower, cabbage, carrots, seed onions, lettuce, and tobacco. The results indicate that (1) the nitrogen in activated or dried sludge is readily available and assimilable; (2) the sludge is very beneficial when applied immediately prior to planting; (3) the sludge gives a rapid early growth which exceeds that of any commercial fertilizer used; and (4) the maturity of the plant is hastened.—Preliminary investigations indicate that the nitrogen content of the sludge can be considerably increased by more rapid and thorough drying and by introducing pure cultures of *Azotobacter* and nitrifying bacteria during activation.—*L. W. Kephart.*

3577. DESCH, C. H. **The nitrogen industry.** *Nature* 110: 670-671. 1922.—This is a summary of several addresses at the Hull meeting of the British Association, dealing with commercial fixation.—*O. A. Stevens.*

3578. MUKHERJEE, J. N. **Experiments on the theory of soil acidity.** *Nature* 110: 732. 1922.—Soil acidity is conceived to be due to the adsorption by soil gels (e. g. silica) of the anions, leaving the cations in a mobile second layer. The latter may be removed, in part, by replacement with a neutral salt. Silica was found to adsorb considerable quantities of acids. Aqueous extracts were neutral, but on shaking with KCl solution an acid extract was obtained. Simultaneous experiments on electro-osmosis demonstrated that the acids are not adsorbed as molecules, but as ions.—*Frank Thone.*

3579. POPE, HAROLD B. **Nauru and Ocean Island. Their phosphate deposits and workings.** *Jour. Dept. Agric. Victoria* 19: 450-469. 12 fig., 3 maps. 1921.—The bird theory regarding the origin of the deposits on these islands is generally accepted. The quality of the phosphate is particularly high, the average tribasic phosphate of lime content being from 5S

per cent to 88 per cent. An account of the discovery and the mining operations is given. [See also Bot. Absts. 12, Entry 874.]-*Wm. E. Lawrence.*

3580. WEISKE, F. *Die Wertverluste des Kalkstickstoffs beim Lagern.* [Loss in value of calcium nitrate in storage.] *Landw. Jahrb.* 54: 601-618. 1920.—The author reviews the literature and reports on a series of experiments on the loss in weight and in nitrogen as well as in the formation of dicyanamid-nitrogen in calcium nitrate. Vegetation experiments were carried on with white mustard. The results confirmed the conclusion drawn from previous experiments, that the formation of any considerable quantity of dicyanamid in the calcium nitrate materially reduces its value as a fertilizer.—*A. J. Pieters.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 2962, 2992, 3012, 3019, 3020, 3027, 3034, 3035, 3036, 3115, 3144, 3147, 3149, 3230, 3274, 3319, 3364)

GENERAL

3581. MEZ, CARL, und KARL KIRSTEIN. *Sero-diagnostische Untersuchungen über die Gruppe der Gymnospermae.* [Sero-diagnostic studies on the groups of Gymnosperms.] *Beiträge Biol. Pflanzen* 14: 145-148. 1920.—The use of serums in testing out the protein relations of various groups of the gymnosperms led to the following results: Positive reactions were obtained between the Abietineae with *Selaginella* and *Magnolia*. The position of *Ginkgo* as a primitive member of gymnosperms is not borne out by the serum test. No reaction was found between *Ginkgo* and *Cycas*. One evolutionary series according to the authors is from Hepaticae to Lycopodiales eligulatae to Lycopodiales ligulatae to Coniferae to Ranales. Another series follows from Hepaticae to Filicales eusporangiatæ to Cycadofilicales to Cycadales to Bennettitales. A relationship between the protein of Gnetales and Coniferae was found. No reaction occurred between any of the Coniferae with Amentales and allied forms of Casuarinaceae, Fagaceae, Juglandaceae, Piperaceae, which confirms earlier results placing the Amentales in the series Ranales, Centrospermae, Myricales, Amentales. From the protein relationship certain morphological conclusions follow such as the homology of the ovuliferous scale of Abietineae and the ligule of Lycopodiales ligulatae.—*Orton L. Clark.*

3582. NORDHAGEN, ROLF. *De nøkenfrøedes stilling i plantesystemet.* [The position of the Gymnospermae in the plant system.] *Naturen* 46: 261-281. *Fig. 1-8.* 1922.

3583. PAU, C. *El herbario de Planellas (Continuação).* [Planellas' herbarium (cont.).] *Broteria Sér. Bot.* 20: 120-129. 1922.—The 3rd article of the series. The discussion covers species of the families Circeaceae to Dipsaceae with notes upon many of them. [See Bot. Absts. 10, Entry 2006; 11, Entry 1599.]-*E. B. Chamberlain.*

SPERMATOPHYTES

3584. BERGER, ALWIN. *Beiträge zur Flora von Afrika. XLIX. Mehrere neue Mesembrianthemum und eine Aloe.* [Contributions to the Flora of Africa XLIX. Several new Mesembrianthemums and one Aloe.] *Bot. Jahrb.* 57: 626-640. 1922.—Owing to a lack of living material and to other difficulties the author is discontinuing his monograph of the genus and is publishing only certain new species chiefly from the former German colony in southwest Africa. The species and names proposed as new are: *Mesembrianthemum olivaceum* Schl. & Berg., *M. nodosum*, *M. annulatum*, *M. diversipapillosum*, *M. leptarthron*, *M. subnodosum*, *M. acutisepalum*, *M. melanospermum*, *M. mentiense*, *M. glareosum*, *M. clavulatum*, *M. solutifolium*, *M. commutatum* (*M. longispinulum* Salm.), *M. trichosantherum*, *M. Cronmeyerianum*, *M. Brunnthaleri*, *M. pungens*, *M. Maximiliani* Schl. & Berg., *M. perspicuum*, *M. vallisgratiæ* Schl. &

Berg., *M. macrocarpum*, *M. Dyckii* (*M. conspicuum* Salm), *M. polypetalum* Schl. & Berg., *M. tenuicaule*, *M. nudicaule*, *M. Rustii*, *M. Schneiderianum*, *M. drepanophyllum* Schl. & Berg., *M. apricum*, *M. tulbaghense*, *M. lunulatum*, *M. abruptum*, *M. oxysepalum* Schl. & Berg., *M. Dielsianum*, and *Aloe linearifolia*.—K. M. Wiegand.

3585. BRANDEGEE, TOWSHEND STITH. *Plantae Mexicanae Purpusianae*, XI. Univ. California Publ. Bot. 10: 181-188. 1 fig. 1922.—The following new species are proposed and described: *Tradescantia heterophylla*, *Gomphrena crassicaulis*, *Lonchocarpus dumetorum*, *Pithecolobium leucospermum*, *Mimosa chaetocarpa*, *Calliandra mexicana*, *C. scopulina*, *Bauhinia* (*Casparia*) *peninsularis*, *Desmodium sylvicola*, *Parosela longeracemosa*, *Hiraea Purpusii*, *Croton sitiens*, *Miconia Purpusii*, *Oenothera thalassaphila*, *Gunnera mexicana*, *Cordia ovata*, *Physalis filipendula*, *Stemmadenia calycina*, *Roseanthus heterophyllus*, *Apodanthera scaberrima*; and the description of the fruit of *Pachystelma cordatum* Brandg. is added.—W. A. Setchell.

3586. CAMUS, A. *Les Andropogonées odorantes des régions tropicales*. [Odoriferous *Andropogoneae* of tropical regions.] Rev. Bot. Appl. 1: 270-306. 1921.—Three genera of this tribe yield essential oils, viz., *Cymbopogon*, *Vetiveria*, and *Amphilophis*. The author describes 40 species of *Cymbopogon*, giving a number of references to synonymy, native names, the principal botanical characters, and brief notes on the economics of particular species. An artificial key precedes the enumeration of species. Under *Vetiveria* one species, *V. zizanioides* Nash, is described and discussed at length; and 4 species of *Amphilophis* are recognized. The following new combinations are included: *Cymbopogon refractus* (*Andropogon refractus* R. Br.), *C. microthecus* (*A. microthecus* Hook. f.), *C. hamulatus* (*A. hamulatus* Nees), *C. rectus* (*A. rectus* Steud.), *C. Goeringii* (*A. Nardus* subsp. *marginatus* var. *Goeringii* Hackel), *C. procerus* (*A. procerus* R. Br.), *C. exaltatus* (*A. exaltatus* R. Br.), *C. ambiguus* (*A. ambiguus* Steud.), *C. bombycinus* (*A. bombycinus* R. Br.), *Amphilophis odorata* (*Andropogon odoratus* Lisboa), and *A. Woodrovii* (*Andropogon Woodrovii* Hook. f.).—Paul Russell.

3587. DANSER, B. H. *Contribution à la systématique du Polygonum lapathifolium*. [Contribution to the systematics of *Polygonum lapathifolium*.] Recueil Trav. Bot. Néerland. 18: 125-210. 3 pl. 1921.—The author records the results of an extended study of *Polygonum lapathifolium* Pers. which he regards as a collective species and for it proposes several subspecies and varieties. The various forms recognized are characterized and discussed in detail.—J. M. Greenman.

3588. ENGLER, A. *Beiträge zur Flora von Afrika*. XLIX. *Scrophulariaceae africanae*. [Contributions to the Flora of Africa XLIX. African *Scrophulariaceae*.] Bot. Jahrb. 57: 609-614. 1922.—The author describes a new genus, *Freyliniopsis*, and 11 new species as follows: *Freyliniopsis Trothae*, *Torenia Dinklagei*, *Phyllopodium Rangei*, *Craterostigma ndassekerense*, *C. kundalungense*, *Alectra Stolzii*, *A. Ledermannii*, *A. moeroensis*, *A. angustifolia*, *A. scharensis*, and *A. Merkeri*.—K. M. Wiegand.

3589. GAGE, A. T. *Euphorbiaceae novae e Peninsula Malayana*. [New *Euphorbiaceae* from the Malay Peninsula.] Rec. Bot. Surv. India 9: 219-249. 1922.—The following new species and combinations appear: *Actephila ovalis* (*Dimorphocalyx ovalis* Ridl.), *Phyllanthodendron dubium* (*Cleistanthus dubius* Ridl.), *Glochidion Kunstlerianum*, *G. Maingayi*, *G. singaporense*, *G. tetrapterum*, *Sauropus Llanosi* (*Glochidion Llanosi* Muell. Arg.), *Drypetes perakensis*, *Antidesma stenophyllum* (non Merrill), *A. Kunstleri*, *A. cruciforme*, *A. gracillimum*, *Aporosa Prainiana* King, *A. symplocoides* (*Baccaurea symplocoides* Hook. f.), *A. confusa*, *Baccaurea Kunstleri* King, *B. Kingii*, *B. Hookeri*, *B. pyriformis*, *Galcaria minor*, *G. Ridleyi*, *Croton lucidum*, *C. confusus*, *Acalypha siamensis* Oliv., *Coelopedas subcordatus*, *Coelodiscus subcuneatus*, *Mallotus brevipetiolatus*, *M. simulaciformis*, *Blumeodendron vernicosum* (*Mallotus vernicosus* Hook. f.), *B. concolor*, *Macaranga setosa*, *M. incisa*, *M. puncticulata*, *M. recurvata*, and *Ptychopyxis angustifolia*.—E. D. Merrill.

3590. HIERN, W. P. On a new species and a new variety of *Diospyros*. Proc. Linn. Soc. New South Wales 45: 211-212. 1921.—*Diospyros austrocaledonica* n. sp. and *D. samōensis* A. Gray var. *ovata* n. var. are described.—*Eloise Gerry*.

3591. JEPSON, WILLIS L. A new species of cypress. Madroño 1: 75. 1922.—*Cupressus Forbesii*, from San Diego County, California, is described as new.—*Roxana Stinchfield Ferris*.

3592. JOHNSTON, IVAN MURRAY. Undescribed plants mostly from Baja, California. Univ. California Publ. Bot. 7: 437-446. 1922.—The following new species, varieties, and combinations are proposed: *Ephedra peninsularis*, *Stenophyllus nesioticus*, *S. Sellowiana* (*Isolepis Sellowiana* Kunth), *Viscainoa geniculata* Greene var. *pinnata*, *Condalia Parryi* Web. var. *microphylla*, *Euphorbia dentosa*, *E. peninsularis*, *E. podagrica*, *Securinega capensis*, *S. fasciculata* (*Bernardia fasciculata* Wats.), *S. Hallii* (*Tretracoccus Hallii* Brandg.), *Mentzelia hirsutissima* Wats. var. *nesiotes*, *M. hirsutissima* Wats. var. *stenophylla* (*M. stenophylla* Urb. & Gilg.), *M. involucrata* Wats. var. *megalantha*, *M. tricuspidis* Gray var. *brevicornuta*, *Cryptantha inaequata*, *C. maritima* Greene var. *pilosa*, *C. racemosa* Greene var. *lignosa*, and *Houstonia australis*.—*W. A. Setchell*.

3593. MERRILL, E. D. Diagnoses of Hainan plants. Philippine Jour. Sci. 21: 337-355. 1922.—Thirty-seven new species of flowering plants are described; these are: *Rhaphidophora Maclurei*, *Disporum hainanense*, *Alpinia Maclurei*, *Piper Maclurei*, *Castanopsis hainanensis*, *Ficus palmatiloba*, *Debregeasia spiculifera*, *Aristolochia hainanensis*, *Fissistigma Maclurei*, *Machilus hainanensis*, *Phoebe hainanensis*, *Cryptocarya hainanensis*, *C. Maclurei*, *C. obtusifolia*, *Rhaphiolepis parvibracteolata*, *Bauhinia Moningeriae*, *Evodia hainanensis*, *Breynia rostrata*, *Antidesma hainanense*, *Mallotus Maclurei*, *Gomphandra hainanensis*, *Gonocaryum Maclurei*, *Meliosma angustifolia*, *Rhamnella hainanensis*, *Adenia Maclurei*, *Eugenia Maclurei*, *Rhododendron hainanense*, *Ardisia Maclurei*, *Sideroxylon rostratum*, *Diospyros cardiophylla*, *Wrightia hainanensis*, *Erycibe hainanensis*, *Radermachera hainanensis*, *Oreocharis flavida*, *Strobilanthes Maclurei*, *Lasianthus hainanensis*, and *Gynura Maclurei*. The study of recently collected material brings the list of Hainan species from about 350 previously known to somewhat over 1000.—*E. D. Merrill*.

3594. MERRILL, E. D. Notes on the flora of southeastern China. Philippine Jour. Sci. 21: 491-513. Fig. 1. 1922.—This paper is based largely on material from Kwangtung Province. It consists of records of species new to the province, with descriptions of 18 new species as follows: *Fokienia Maclurei*, *Polychroa Tsoongii*, *Loranthus Maclurei*, *Euchresta trifoliolata*, *Atalantia kwangtungensis*, *Chisochiton chinensis*, *Trigonostemon chinensis*, *Koeleruteria integrifoliola*, *Elaeocarpus glabripetalus*, *Eurya stenophylla*, *Shorea chinensis*, *Eugenia Tsoongii*, *Ligustrum Tsoongii*, *Tabernaemontana chinensis*, *Botryopleuron longispicatum*, *Thunbergia chinensis*, *Hedyotis platystipula*, and *Pentaphragma spicatum*. *Ichnocarpus volubilis* (Lour.) Merr. is adopted as the oldest name for *I. ovatifolius* A. DC.—*E. D. Merrill*.

3595. MERRILL, E. D. Additions to our knowledge of the Bornean flora. Philippine Jour. Sci. 21: 515-534. 1922.—Seven previously described species are for the first time recorded from Borneo and the following 19 are described as new: *Pothos mirabilis*, *Quercus borneensis*, *Ficus inaequipetiolata*, *Orophea myriantha*, *Lunasia gigantifolia*, *Chisocheton polyandrus*, *Aporosa grandistipula*, *Cyclostemon Castilloi*, *Zizyphus lenticellata*, *Sterculia acuminatissima*, *S. Hosei*, *S. longipetiolata*, *S. membranacea*, *S. Yatesi*, *Saurauia Agamae*, *Rinorea Castilloi*, *Tabernaemontana polysperma*, *Premna glandulosa*, and *Psychotria Agamae*.—*E. D. Merrill*.

3596. PAYSON, EDWIN BLAKE. Species of *Sisymbrium* native to America north of Mexico. Univ. Wyoming Publ. Bot. 1: 1-27. 1922.—The usual interpretation of the generic name *Sisymbrium* is accepted in the present paper and the application of this name to the water-cross, as has been made by certain American authors, is not approved. *Sisymbrium altissimum* L. is regarded as the generic type. The following general conclusions in regard to the

phylogeny of the species of *Sisymbrium* have been reached by a consideration of the American species: (1) An annual or biennial habit of growth is more primitive than the perennial habit; (2) a stipe or gynophore that raises the ovary above the torus is a primitive character; (3) a long, terete pod is more primitive than a short or compressed one; (4) in the primitive species the petals were probably purplish; (5) the racemose type of inflorescence is thought to be more primitive than the corymbose type; (6) the leaves of the ancestral species were probably entire and amplexicaul; (7) trichomes were not present in the more primitive species and their presence is held to be a sign of specialization. The genus is believed to have originated in Arizona and *S. ambiguum* is the most primitive species. A complete taxonomic treatment is given for the 11 species native to America north of Mexico. The following new species, new transfers and new names occur: *Sisymbrium ambiguum* (*Thelypodium ambiguum* Wats.), *S. juniperorum*, *S. aureum* (*Thelypodium aureum* Eastw.), *S. elegans* (*Thelypodium elegans* Jones), *S. Vaseyi* (*Thelypodium Vaseyi* Coulter), *S. Watsonii* (*S. Vaseyi* Wats.), *S. linearifolium* (*Streptanthus linearifolius* Gray).—*E. B. Payson.*

3597. REHDER, ALFRED. New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum. Jour. Arnold Arboretum 3: 207-224. 1922.—The present article contains the following new species, varieties, hybrids, combinations and names: *Juniperus squamata* var. *Meyeri*, *J. lucayana* var. *bedfordiana* (Loud.), *Pinus nigra* var. *cebennensis* (Godr.), *Potentilla fruticosa* var. *Purdomii*, *R. Maximowicziana* var. *Jackii* (Rehd.), *R. omeiensis* f. *chrysocarpa*, *Hamamelis virginiana* f. *rubescens*, *Skinmnia Reevesiana* f. *rubella* (Carr.), *R. Reevesiana* f. *variegata*, *S. Foremanii* var. *Rogersii* (Mast.), *Cotinus coggygria* f. *purpureus* (Dupuy-Jam.) × *Ilex Beanii*, *I. Macfadyenii* (Walp.), *Viburnum corymbosum* (Mill.), *Euscaphis japonica* var. *ternata*, *Acer stenolobum*, *A. cappadocicum* f. *rubrum* (Kirchn.), *A. Buergerianum* var. *trinerve* (Dipp.), *A. Opalus* var. *tomentosum* (Tausch), *A. Hersii*, *Aesculus discolor* var. *Koehnei*, *A. turbinata* var. *pubescens*, *Zizyphus jujuba* Mill. var. *inermis* (Bge.), *Rhamnus Alaternus* f. *argenteo-variegata* (West.), × *Ceanothus pallidus* var. *roseus* (Spach), × *C. pallidus* var. *plenus*, *Vitis Thunbergii* var. *sinuata* (Reg.), *V. Piasezkii* var. *Pagnuccii* (Romanet du Caill.), *Camellia elongata* (Rehd. & Wils.) and *Viburnum Sargentii* f. *flavum*. The synonymy of *Ilex vomitoria* Ait. and of *Ceanothus coerulea* Lag. and × *C. Delilianus* Spach is also discussed. [See Bot. Absts. 8, Entry 734; 10, Entry 370; 11, Entry 4862.]—*Alfred Rehder.*

3598. REHDER, ALFRED. Two new Asiatic poplars. Jour. Arnold Arboretum 3: 225-227. 1922.—*Populus Purdomii* from northwestern China and *P. koreana* from Korea are described.—*Alfred Rehder.*

3599. ROSEN, F. Über die Samen einiger Speisekürbisse. [Concerning the seeds of a few squashes.] Beitr. Biol. Pflanzen 14: 1-17. Fig. 1-24. 1920.—The many varieties of squashes may all be grouped under the 3 species: *Cucurbita Pepo* L., *C. maxima* Duch., and *C. moschata* Duch. The anatomical differences in the seeds of the first 2 species are discussed in detail as bearing on the origin of the different garden forms of squashes.—*Orton L. Clark.*

3600. SANDS, W. N. Botanical notes on the Brazil nut tree in Malaya. Malayan Agric. Jour. 10: 130-132. 1922.—Young [Bot. Gaz. 52: 226. 1911] discussed the origin of the Brazil nut and assigned it to *Bertholletia nobilis*. Petch [Ann. Roy. Bot. Gard. Peradeniya 5: 421. 1914] reported on the Brazil nut as cultivated in Ceylon and decided that the characters of *B. nobilis* and *B. excelsa* were alike exhibited in the tree at Peradeniya in such a way as to shake belief in the distinctness of the 2 species. Deshmukh [Gard. Bull. Straits Settlements 2: 435. 1921] did the same for trees in Singapore with the same result. In this paper Sands reports on trees at Kuala Lumpur, but gives no personal opinions.—*I. H. Burkill.*

3601. SARGENT, C. S. Notes on North American trees, X. Jour. Arnold Arboretum 3: 182-207. 1922.—This paper deals chiefly with *Crataegus* and the following species and varieties are described as new: *Crataegus swanensis*, *C. ohioensis*, *C. Warneri*, *C. poliophylla*, *C. steno-*

sepala, *C. abbreviata*, *C. desertorum*, *C. tripartita*, *C. anamesa*, *C. antiplasta*, *C. antimima*, *C. sutherlandensis*, *C. sutherlandensis* var. *spinescens*, *C. caeruleascens*, *C. ellipticifolia*, *C. marietensis*, *C. uvaldensis*, *C. rotundifolia* var. *aboriginum* (Sarg.), *C. rotundifolia* f. *rubescens*, *C. mercerensis*, *C. meiophylla*, *C. Margaretta* var. *Brownii* (Britt.), *C. Margaretta* var. *xanthocarpa*, *C. Harveyana*, *C. conjungens*, *C. choriophylla*, *C. Croomiana*, *C. Victorinii*, *C. carollensis*, *C. kingstonensis*, *Betula neolaskana*. A note on *Gleditsia texana* Sarg., which is considered a hybrid between *G. triacanthos* and *G. texana*, concludes the article. [See also Bot. Absts. 8, Entry 740; 10, Entry 372; 11, Entry 4865].—*Alfred Rehder*.

3602. SCHINZ, HANS, und ALBERT THELLUNG. Beiträge zur Kenntnis der afrikanischen Flora (XXX.) [Contributions to a knowledge of the African flora (XXX.)]. Vierteljahrsschr. Naturf. Ges. Zürich 55: 221-256. 1921.—The following new species and varieties are described: *Celosia Schaeferi* Schinz, *Cyathula hereroensis* Schinz, *Podalyria pulcherrima* Schinz, *Borbonia parviflora* Lam. var. *glabrescens* Schinz, *Buchenroedera Jacottetii* Schinz, *Argyrolobium glaucum* Schinz, *Rhynchosia Dinteri* Schinz, *R. Jacottetii* Schinz, *R. sordida* Schinz (*R. Orthodanum* Benth. *Orthodanum sordidum* E. Mey.), *Eriosema ellipticifolium* Schinz, *E. fasciculatum* Schinz, *Hermannia hyssopifolia* L. var. *integerrima* Schinz, *H. setosa* Schinz, *Gnidia clavata* Schinz, *G. psilotoides* Schinz, *Anticharis azurea* Dinter, *Vernonia pinifolia* (Lam.) Less. var. *canescens* (Rehm.) Thell., *V. hirsuta* (DC.) Sch. Bip. × *pinifolia* (Lam.) Less. Schlechter & Thell. hybr. nov. = *V. adulterina* Thell., *Aster Peglerae* Bolus var. *longipes* Thell., *Felicia erucifolia* Thell., *Chrysocoma subumbellata* Thell., *Helichrysum Moeserianum* Thell., *H. aretioides* Thell., *Lopholaena pauciflora* Thell., *L. longipes* (*Doria longipes* Harv.), *Othonna denticulata* Ait. var. (?) *Schlechteri* Thell., *Senecio achilleifolius* DC. var. *glandulososaber* Thell., *S. Serra* Sonder var. *longipedunculatus* (Volkens) Thell., *S. albanensis* DC. var. *pseudo-decurrens* Thell., *S. serratuloides* DC. var. *typicus* Thell., var. *Rehmannii* Thell., var. *Dieterleni* Thell., var. *Holubii* Thell., *S. isatiedus* DC. var. *typicus* Thell. var. *macrophyllus* Thell., *Ursinia Jacottetiana* Thell., *U. Bolusii* Thell., *Dicoma thyrsiflora* (Klatt) Thell., *Sonchus delagoënsis* Thell., *S. scapiformis* Thell., *Crepis hypochoeridea* (DC.) Thell. var. *Junodiana* (O. Hoffm.) Thell., var. *Woodii* Thell., var. *genuina* Thell.—*John H. Schaffner*.

3603. SCHINZ, HANS, und ALBERT THELLUNG. Weitere Beiträge zur Nomenklatur der Schweizerflora (VII.) (Beiträge zur Kenntnis der Schweizerflora XVIII.) [Further contributions to the nomenclature of the Swiss flora (VII.)] (Contributions to a knowledge of the Swiss flora XVIII.) Vierteljahrsschr. Naturf. Ges. Zürich 66: 257-317. 1921.—Various emendations and corrections of the names of Swiss plants are recorded. The following new combinations occur: *Trichophorum pumilum* Schinz & Thellung (*Scirpus pumilus* Vahl.), *Hymenobolus pauciflorus* Schinz & Thellung (*Capsella pauciflora* Koch), *Erysimum silvestre* (Crantz) Scop. subsp. *helveticum* (Jacq.) Schinz & Thellung and subsp. *Cheiranthus* (Pers.) Schinz & Thellung, *Viola montana* L. subsp. *Ruppii* (All. pro. spec. pro parte, Gaudin sub. *V. montana* pro parte) Schinz & Thellung, *Senecio capitatus* (Wahlenb.) Steudel var. *tomentosus* (DC.) Schinz & Thellung.—*John H. Schaffner*.

3604. SCHLECHTER, R. Beiträge zur Flora von Afrika XLIX. Campanulaceae-Lobeliaee novae africanae. (Contributions to the Flora of Africa XLIX. [New African Campanulaceae of the tribe Lobeliaee.] Bot. Jahrb. 57: 615-625. 1922.—The following species and varieties are described as new: *Lobelia Galpinii*, *L. omphalodoides*, *L. Seineri*, *L. dolichopus*, *L. ilysanthoides*, *L. Kirkii* R. E. Fries var. *microphylla*, *L. knysnensis*, *L. Ledermannii*, *L. odontoptera*, *L. pilosa*, *L. Rudatisii*, *L. Stolzii*, *L. transvaalensis*, *L. ardisiandroides*, *L. dichroma*, *L. Schaeferi*, and *Laurentia longiflora*.—*K. M. Wiegand*.

3605. SZABÓ, Z. Beiträge zur Flora von Afrika. XLIX. Diagnoses Cephalariarum novarum. [Contributions to the flora of Africa XLIX. Diagnoses of new Cephalarias.] Bot. Jahrb. 67: 641-644. 1922.—The following species are described as new: *Cephalaria Galpiniana*, *C. Zeyheriana*, *C. Wilmsiana*, *C. pungens*, *C. taurica*, *C. Sieberi*, and *C. rupestris* Griseb.—*K. M. Wiegand*.

3606. VILLAR, EMILIO del. *El género Gossypium en España*. [The genus *Gossypium* in Spain.] *Broteria Sér. Bot.* 20: 49-72. 1922.—The literature relating to the growth and occurrence of cotton in Spain contains many points that require clearing up, especially as regards the forms actually cultivated. The author's work is based upon collections made in Granada, Malaga, Cadiz, Seville, and Cordova, taken in connection with a digest of the information in some 30 publications, of which a list is given. A résumé of the various species proposed for cultivated cottons is given, with notes upon the validity of the different forms. The author concludes that, taking Schumann's classification as a basis only *Gossypium herbaceum* and *G. barbadense* or their hybrids have been grown in Spain, at least during the past 150 years. Reports of the occurrence of *G. arboreum* seem based upon a misreading of the Arabian author Abu-Zacaria. Of *G. herbaceum* only the variety *hirsutum* seems to occur in cultivation, though some strains indicate traces of hybridization with var. *indicum*. The author describes in detail material of *G. barbadense* representing the "tipo motrileño" of Clemente, no longer cultivated; material from Barrancho de Cantarrijan of the *barbadense* type that has survived cultivation for some 15 years in a semi-wild state; and the 2 sorts cultivated in Malaga under the name "Jumel" (*barbadense*) and "Upland" (*herbaceum*) with two hybrid forms.—*E. B. Chamberlain*.

3607. WINKLER, HUBERT. *Beiträge zur Flora von Papuasien. VIII. Die Urticaceen Papuasien*. [Contributions to the flora of Papuasias VIII. The Urticaceae of Papuasias.] *Bot. Jahrb.* 57: 501-608. 15 fig. 1922.—This region is very rich in Urticaceae many of which are endemic. Keys to the species are given, also extensive notes on structure and distribution. The following new species, varieties, combinations and names are proposed: *Laportea decumana* (Roxb.) Wedd. var. *pedunculata* (*L. pedunculata* Lauterb. & K. Schum.); *L. Schlechteri*; *L. Rechingeri*; *L. crenulata* Gaud. var. *nitida*, and var. *nervosa*; *L. mammosi-setosa*; *L. Warburgii*; *Pilea stenoneura*; *P. pellis crocodili*; *P. cuneata*; *L. plicatidentata*; *P. caudata*; *P. effusa*; *P. Schlechteri*; *P. papuana*; *P. Ledermanni*; *P. stellarioides*; *P. minutissima*; *Elatostema cyrtandra*; *E. Lauterbachii*; *E. articulatum*; *E. elegans*; *E. macrophyllum* Brongn. var. *majusculum* (*E. frutescens* (Bl.) Hassk. var. *majuscula* K. Schum.); *E. Pulleanum*; *E. serra*; *E. annulatum*; *E. novo-guineense* Warb. var. *latifolium*, var. *trapesoideum*, var. *stenopus*, and var. *uber*; *E. Ledermanni*, *E. macropus*; *E. subintegrum*; *E. sesquifolium* (Reinw.) Hassk. var. *ramosum*, and var. *caudatum*; *E. piliferum*; *E. cupulare*; *E. densum*; *E. Lingelshemii*, also its var. *adscendens* and var. *seriatum*; *E. peperomioides*; *E. tenuicaule*; *E. rudicaule*; *E. velutinicaule*; *E. Reiterianum*; *E. mongiense* Lauterb. var. *gracile*; *E. trichomanes*; *E. hymenophyllum*, and var. *Stollei*; *E. tricuspe*; *E. longicollum*; *E. fragile*; *E. barbarufa*; *E. Pellionianum* Gaud. var. *pedunculatum*, var. *effusum*, and var. *Novae-Britanniae* (*E. Novae-Britanniae* Lauterb.); *E. angulare*; *E. pauperatum*; *E. undulatum*; *E. Warburgii* (*Pellionia nigrescens* Warb.); *E. Hoffmannianum*; *E. peltifolium* (*Pellionia peltata* Ridl.); *E. Weinlandii* K. Schum. var. *vestitum*, var. *dispar*, var. *Kochii* (*Pellionia Kochii* Valet.), and var. *ylense* (*E. ylense* Hall. f.); *E. cauliflorum*; *E. Hallieri*; *E. paramelanum*; *E. inamoenum*; *E. lanceolatum*; *E. Hoelscherianum*; *E. Janowskyi*; *E. jabiense*; *E. pedunculatum* Forst. var. *angustum*; *E. Grünigii*, and var. *Krausei*; *E. frutescens* (Bl.) Hassk. var. *fuscifurfuracea*, var. *novoguineense* (*Procris frutescens* var. *novoguineense* Valet.), var. *sculptum*, and var. *caudatum*; *E. decurrens*; *E. rectangulare*; *Cypholophus rotundifolius*; *C. decipiens*, and var. *tenuifolius*; *C. pachycarpus*; *C. radicans*; *C. patens*; *C. reticulatus*; *C. Englerianus*; *C. velutinus*; *C. trapula*, and var. *hirsuta*; *C. Gjellerupii*; *C. Ledermanni*; *C. nummularis*; *C. chamaephyton*; *C. vaccinioides*; *C. Treubii*, *C. Friesianus* (*Pilea Friesiana* K. Schum.); *C. integer*; *C. Pulleanus*, *Pipturus verticillatus*; *P. subinteger*; *P. Ledermanni*; *P. Pullei*; *P. lithospermum*; *P. repandus* (Bl.) Wedd. var. *rufescens*; *Conocephalus hirsutus*; *C. subscaber*; *C. amboinensis* (Zipp.) Warb. var. *crassus*, and var. *longifolius*; *C. Parianus*; *C. Gjellerupii*; *Leucosyke rhodopleura* (*Villebrunia rhodopleura* Bl.); *L. montana*; *L. pulchra* (*Debregeasia pulchra* Ridl.); *Maoutia grandifolia* (*Pipturus grandifolius* Ridl.); *M. ambigua* Wedd. var. *Warburgii* (*M. Warburgii* Boerl.), var. *villosa*, var. *scyphochlamys*, and var. *Chalmersi*.—*K. M. Wiegand*.

3608. WOLF, W. *Notes on Alabama plants*. *Amer. Midland Nat.* 8: 104-127. Pl. 1-3. 1922.—A new genus of monotropoid plants, *Cryptophila* gen. nov., is described from Alabama.

Cryptophila pudica sp. nov. is the new species and *C. pudica* forma *maxima* f. nov. and *C. pudica* var. *Knapkei* var. nov. are also described. The genus is placed in a new tribe, viz., *Cryptophileae*. It differs from tribe *Eumonothepeae* in having a one-celled ovary (several-celled near the base) and indehiscent fruit; and from tribe *Pleuricosporeae* in having anthers opening by pores and indehiscent fruit. The plants seem to be true saprophytes. They grow, flower, and fruit under a cover of leaves. The habitat is given as the xerophile mixed forest of the upland. The flowering scapes make their appearance in October and November; anthesis occurs in March and April; and fruit matures in July and August. Nothing is known of the geographical range. The type specimens were collected in St. Bernard, Cullman County, Alabama, and have been deposited in the herbarium of St. Bernard College.—Ray C. Friesner.

REVISIONS AND MONOGRAPHS

3609. JEPSON, WILLIS L. **Revision of the California species of the genus *Arctostaphylos*.** Madroño 1: 76-96. Fig. 1-3. 1922.—The author deals with 23 species and 10 varieties, giving descriptions, synonymy, geographical, ecological and taxonomic notes and a key. The following new species, varieties and combinations are made: *A. glauca* Lindl. var. *eremicola*, *A. mariposa* Dudley var. *bivisum*, *A. patula* Greene var. *incarnata*, *A. manzanita* Parry var. *apiculata*, *A. pastillosa*, *A. nummularia* Gray var. *myrtifolia* (*A. myrtifolia* Parry), *A. sensitiva*, *A. glandulosa* Eastw. var. *vestita* (*A. vestita* Eastw.), *A. glandulosa* Eastw. var. *crassifolia*, *A. glandulosa* Eastw. var. *virgata* (*A. virgata* Eastw.), *A. Andersonii* Gray var. *auriculata* (*A. auriculata* Eastw.), *A. Andersonii* Gray var. *pechoensis* (*A. pechoensis* Dudley). The author utilizes the biological reaction of the various forms to fire as a support for the conception of species that he has adopted.—Roxana Stinchfield Ferris.

3610. JEPSON, WILLIS L. **Revision of the California species of the genus *Downingia* Torr.** Madroño 1: 98-102. Fig. 1-4. 1923.—Critical diagnoses and a key to the 7 species of *Downingia* recognized by the author are given and the following new variety and new combination are made: *D. pulchella* Torr. var. *arcana*, *D. bicornuta* Gray var. *montana* (*D. montana* Greene).—Roxana Stinchfield Ferris.

3611. MACKENZIE, K. K. **A monograph of the California species of the genus *Carex*.** Erythea 8: 7-95. Fig. 1-51. 1922.—This work rests primarily upon an extensive series of specimens of both the early and the recent collectors in California. In addition to the formal diagnoses there is critical discussion of relationships and of doubtful points, full citation of localities, references to the literature for each species, and a general bibliography. One hundred and twenty-six species are described, 10 being new: *Carex stenoptera*, *C. Dudleyi*, *C. fracta*, *C. Tracyi*, *C. unilateralis*, *C. Helleri*, *C. paucicostata*, *C. breviligulata*, *C. montereyensis*, and *C. flaccifolia*. One new combination is made: *Carex ormantha* (*C. echinata* Murr. var. *ormantha* Fernald).—W. L. Jepson.

3612. PAYSON, EDWIN BLAKE. **A synoptical revision of the genus *Cleomella*.** Univ. Wyoming Publ. Bot. 1: 29-46. 1922.—*Cleomella* is a Capparidaceous genus that extends from Oregon and central Idaho to south-central Mexico and from Texas to California. Eighteen species are recognized provisionally and a key to these is provided. Descriptions are given for each species and specimens and synonyms are cited. *C. mexicana* Moc. & Sessé is the generic type. The following new species are described: *C. Macbrideana* and *C. mojaviensis*.—E. B. Payson.

3613. WILSON, ERNEST HENRY, and ALFRED REHDER. **A monograph of *Azaleas*, *Rhododendron* subgenus *Anthodendron*.** Publ. Arnold Arboretum 9. 8 vo. 3 + 219 p. Cambridge, Massachusetts, 1921.—The work is divided into 2 parts: The *Azaleas of the Old World* by E. H. Wilson (pp. 1-105) and the *Azaleas of North America* by A. Rehder (pp. 107-205) followed by an index to both parts. In the first part E. H. Wilson gives, after short introductory chapters on the history, distribution and classification, a systematic enumeration of all species, varieties and forms spontaneous as well as cultivated of the *Azaleas* of the Old

World with keys to the sections, (among which is the new section *Sciadorhodion* Rehd. & Wils.) and to the species, and a complete synonymy under each recognized group and a citation of specimens examined followed by detailed remarks on the history, distribution, taxonomic characters, cultivation etc. Four sections and 34 species with numerous varieties and forms are recognized by the author and the following new species, varieties, forms, hybrids, combinations and names are proposed: *Rhododendron indicum* f. *polypetalum* (Maxim.), f. *laciniatum*, (Mak.), *R. Kanehirai*, *R. obtusum* f. *macrostemon* (Maxim.), f. *amoenum* (Lindl.), f. *japonicum* (Maxim.), var. *Kaempferi* (Planch.), var. *Kaempferi* f. *albiflorum*, f. *multicolor*, f. *plenum*, f. *Komatsui* (Nak.), f. *monstrosum*, f. *cryptopetalum* (Maxim.), f. *mikawanum* (Mak.), × *R. Sanderi*, *R. Simsii* var. *vittatum* (Fort.), var. *vittatum* f. *Bealii* (Fort.), var. *eriocarpum* (Hay.), *R. phoeniceum* f. *semiduplex*, f. *Smithii* (Sweet), f. *splendens* (D. Don), var. *calycinum* (Lindl.), var. *calycinum* f. *Maxwellii* (Hort. Wezelenburg), *R. mucronatum* f. *Noordtianum* (Wittm.), f. *Mattapan* (Hovey), f. *narcissiflorum* (Planch.), f. *sekidera* (Komatsu), var. *ripense* (Mak.), f. *amethystinum*, f. *plenum* (Sims), *R. linearifolium* var. *macrosepalum* f. *dianthiflorum* (Carr.), f. *decandrum*, *R. reticulatum* var. *albiflorum* (Mak.), f. *pentandrum*, × *R. mixtum*, *R. japonicum* f. *aureum*, *R. luteum* var. *macranthum* (Bean). In the second part, A. Rehder, gives, after a short introduction dealing with the classification history and distribution, a systematic enumeration of the species, varieties and forms spontaneous and cultivated of the Azaleas of North America of which 17 species belonging to 2 sections are recognized; a key to the species precedes the enumeration and under each group the complete synonymy and a description is given followed by a citation of specimens examined and by detailed remarks. This enumeration of the American species is followed by a chapter on hybrids of the subgenus including those of the Old World preceded by a short historical sketch on the origin of the cultivated hybrids; all the hybrids known are enumerated with remarks on their history and distinguishing characters. A list of doubtful names and of illustrations of garden forms (exclusive of Indian Azaleas) not mentioned elsewhere in the book concludes the second part, in which the following new species, varieties, forms and hybrids are proposed: *R. canadense* f. *albiflorum* (Rand & Redf.), f. *viridifolium* Fernald, *R. occidentale* var. *sonomense* (Greene), *R. calendulaceum* f. *aurantium* (Sweet), *R. nudiflorum* var. *glandiferum* (Porter), *R. roseum* (Loisel.), *R. alabamense*, *R. canescens* f. *subglabrum*, var. *candidum*, *R. atlanticum* (Ashe), f. *neglectum* (Ashe), var. *luteo-album* (Coker), *R. serrulatum* f. *molliculum*, var. *georgianum*, *R. viscosum* f. *rhodanthum*, var. *glaucum* f. *rubescens* (Sweet), var. *tomentosum* (Dum.-Cour.), var. *montanum*, var. *montanum* f. *coerulescens*, var. *aemilans*, *R. arborescens* var. *Richardsonii*, × *R. gandavense* (K. Koch), var. *plenum*, × *R. Anneliesae*, × *R. viscossepalum* (Gard. Chron.), var. *Daviesii* (Gard. Chron.), × *R. norbitonense* var. *aureum* (Paxt.), var. *broughtonianum* (André), × *R. Crouxii* (Croux), f. *plenum*. Incidentally the new name *R. Adamsii* is proposed for *R. fragrans* Maxim. not Paxt. (*Azalea fragrans* Adams).—A. Rehder.

FLORISTICS AND PLANT DISTRIBUTION

3614. ANONYMOUS. Schedae ad Floram Romaniae exsiccatam, a museo botanico Universitatis Clusienensis editam. Centuria 1 et 2. [Exsiccatae illustrating the flora of Roumania, edited by the Botanical Museum of the University of Cluj.] Bull. Inform. Grăd. Bot. Muz. Bot. Univ. 1: 1-24. 1921; 2: 18-36. 1922.—Among the 2 centuries of plants issued under the above title the following numbers are especially noteworthy: no. 80, *Melampyrum nemorosum* L. subsp. *romanicum* Borza n. subsp. with original diagnosis; no. 82, *Plantago Schwarzenbergiana* Schur. f. *macrophylla* and f. *microphylla* Schur. with critical notes by Al. Borza; no. 99, *Centaurea dacica* Borza n. sp. with original diagnosis; no. 151, *Castalia Lotus* (L.) Tratt. from the region of Oradea Mare, the only known European locality; no. 179, × *Anchusa Procopiani* Gagul. n. hyb., a hybrid between *Anchusa procera* Besser and *A. ochroleuca* M. B. with original diagnosis; no. 194, *Leontopodium alpinum* Cass. f. *laxiflorum* (Roch) Borza, and f. *intregaldense* Borza with critical notes.—M. Tiesenhausen.

3615. ANONYMOUS. [Rev. of: ACHARIYAR, RAI BAHADAR K. RANGA, assisted by C. TADULINGA MUDALIYAR. A handbook of some south Indian grasses. vi + 318 p. Butter-

worth and Co.: Calcutta; Constable and Co.; London, 1921 (see Bot. Absts. 11, Entry 3426).] Nature 110: 376. 1922.—[See also Bot. Absts. 11, Entry 2321.]

3616. BLATTER, E. *Flora Arabica, Part III. Campanulaceae-Verbenaceae*. Rec. Bot. Surv. India 8: 283-365. 1921.—This consists of a list of species with bibliographic citations, synonyms, citation of specimens, distribution, and local names. No new names appear.—*E. D. Merrill*.

3617. BORZA, A. *Note critice asupra speciei colective Melampyrum nemorosum și formele intrudite din România*. [Critical observations on the collective species *Melampyrum nemorosum* and the related forms in Roumania.] Bul. Soc. Științe Cluj 1: 141-148. 1921.—Two species of *Melampyrum* are found in Roumania, which have colored bracts. These are: *M. bihariense* A. Kerner and *M. nemorosum* L. subsp. *romanicum* Borza. Of the latter two forms occur which the author designates as *M. nemorosum* subsp. *romanicum* Borza proles *aestivalis coronense* (Ove Dahl) Borza, and *M. nemorosum* subsp. *romanicum* Borza var. *viride* (Schur) Borza. The author endeavors in this way to eliminate the confusion which has hitherto prevailed in regard to this species-complex.—*M. Tiesenhausen*.

3618. COCKS, R. S. *A list of the shrubs of Louisiana*. Jour. Arnold Arboretum 3: 173-182. 1922.—The author presents a systematic list of the shrubs found in Louisiana with notes on their distribution and flowering and fruiting time.—*Alfred Rehder*.

3619. BURTT DAVY JOSEPH. *The distribution and origin of Salix in South Africa*. Jour. Ecology 10: 62-86. 6 fig. 1922.—The dimorphic character of the leaves presents a difficulty in distinguishing the willows of Africa. The present author distinguishes 22 named species and varieties, 20 being local endemics usually occurring in one river basin only. Six occur in South Africa, 12 in tropical Africa and Madagascar while 1 species only is common to South and central Africa. Each drainage basin usually carries 1 species only. The isolation of species has been brought about by: (1) the intermittent flow of streams, (2) the regular and prolonged character of the dry season on the watersheds and, (3) the density of the tropical rain-forest vegetation. Isolation is clearly connected with the evolution of distinct types. Hybrids are rare. The species are not relics but modern types apparently descended from *Salix safsaf* of tropical Africa and Syria which has given rise to a western and an eastern group. The migration in tropical Africa has been up the Nile basin and along the Congo and Zambesi river systems while in South Africa it has been around the coast. Of the 22 recognized species and varieties two varieties, namely, *S. mucronata* Thunb. var. *integra* and *S. mucronata* Thunb. var. *caffra* are new.—*Geo. D. Fuller*.

3620. EWART, A. J. *Contributions to the flora of Australia, No. 29*. Proc. Roy. Soc. Victoria (N. S.) 33: 226-232. 2 text fig. 1921.—The following plants and their source are included: *Asperula scoparia* Hook. f. var. *elongata* Benth., *Bartsia Trixago* L., *Bassia quinque-cuspis* F. v. M. var. *villosa* Benth., *Beyeria virgata* n. sp. (figured), *Claytonia perfoliata* Don., *Eleusine indica* Gaertn., *Erica lusitanica* Rud., *Eucalyptus miniata* A. Cunn., *Frankenia setosa* W. V. Fitzg., *Grevillea ceratocarpa* Diels., *G. incrassata* Diels, *Kyllingia intermedia* R. Br., *Medicago echinus* DC., *M. minima* L., *Microcala filiformis* Hoff. & Link., *Muscari botryoides* Mill., *M. racemosum* Mill., *Notholaena distans* R. Br., *Panicum piligerum* F. v. M., *P. repens* L., *Pimelea Husseyana* F. v. M., *Polygonum articulatum* R. Br., *Psammomya* Diels & Loes., *Ptilotus* R. Br., and *Trichinium* R. Br., *Sclerochloa dura* Beauv., *Selaginella stolonifera* Spring, *Suriana maritima* L.—*Eloise Gerry*.

3621. FISCHER, C. E. C. *A survey of the flora of the Anaimalai Hills in the Coimbatore District, Madras Presidency*. Rec. Bot. Surv. India 9: 1-218. Pl. 1-5, map, index I-XXI. 1921.—A simple enumeration of the 1828 species found in the area. No new names appear. The introduction contains notes on the topography, geology, climate, peoples, botanical history, and the general characters of the flora.—*E. D. Merrill*.

3622. GAMBLE, J. S. *Flora of the Presidency of Madras. Part V.* p. 769-962. Adlard and Son and West Newman: London, 1923.—This part includes the families Ebenaceae to Scrophulariaceae ending with the genus *Ilysanthes*. The following new combinations are indicated: *Linociera zeylanica* (L. *purpurea* Vahl), *Rejoua dichotoma* (*Tabernaemontana dichotoma* Roxb.), *Brachystelma brevitubulatum* (*Ceropegia brevitubulata* Bedd.), *Cordia evolutior* (C. *fulvosa* var. *evolutior* C. B. Clarke), and *Torenia travancorica* (T. *asiatica* Hook. f., in part).—J. M. Greenman.

3623. HOLMBOE, JENS. Den gamle lind med flogrognen ved "Stiftsgaarden" i Bergen. [The old *Tilia* with the "flogrogn" (*Sorbus*) at "Stiftsgaarden" in Bergen.] *Naturen* 46: 111-119. Fig. 1-4. 1922.

3624. HOLMBOE, JENS. Dverg-aalegraeset (*Zostera nana* Roth.) og dets forekomst ved den norske kyst. [*Zostera nana* and its occurrence on the Norwegian coast.] *Naturen* 46: 313-320. Fig. 1-4. 1922.

3625. HOLMBOE, JENS. *Leontodon hispidus* L., en sen indvandrer i Vestlandets og Sørlandets flora. [*Leontodon hispidus* L., a late immigrant in the flora of western and southern Norway.] *Bergens Mus. Aarb. Naturv. Raekke* 1920/1921²: 1-11. Fig. 1, 1 map. 1922.—This plant was discovered as new to Norway in 1833 and was later found to occur in 2 different parts of the country, viz. on small areas in western Norway on the islands of southwestern Hordaland, the Haugesund peninsula and on Karmøyen, as well as a single occurrence in southern Norway on the Barland peninsula near Kragerø. The occurrence and distribution is thoroughly discussed and also the European distribution. The author is of the opinion that the plant has far from reached its northern limit, and the reason for its peculiar distribution is that the plant has immigrated comparatively recently. His opinion is that *Leontodon hispidus* has immigrated to western Norway from England or Scotland, and to the Kragerø district from Denmark or Sweden. The length of the period elapsed since the immigration is uncertain, but is perhaps not long, even according to human chronology.—K. Münster Ström.

3626. KELLER, ROBERT. Studien ueber die geographische Verbreitung schweizerischer Arten und Formen des Genus *Rubus*. [Studies on the geographical distribution of the Swiss species and forms of the genus *Rubus*.] *Vierteljahrsschr. Naturf. Ges. Zürich* 64: 519-538. 1919.—This is the 4th contribution on the subject and gives habitats and localities of species, varieties, and forms, besides Latin descriptions of 8 new forms. Those described as new are: *R. cuspidifer* f. *harpagonifer* Sudre & Keller, *R. tomentosus* f. *inuncatus* Rob. Keller, *R. foliosus* f. *conjungens* Rob. Keller, *R. foliosus* f. *rhenanus* Rob. Keller, *R. furvus* f. *pallidus* Rob. Keller, *R. furvus* f. *pallidistamineus* Sudre & Keller, *R. tereticaulis* f. *subangulatus* Rob. Keller, *R. tereticaulis* f. *densispinus*, Rob. Keller.—John H. Schaffner.

3627. LAWSON, P. B. A list of the grasses of Douglas County. *Trans. Kansas Acad. Sci.* 30: 336-339. 1919/21 [1922].—The author presents a list, without annotations, of 107 grasses in Douglas County, Kansas, made in connection with a study of leaf hoppers.—F. C. Gates.

3628. LONG, BAYARD. *Sonchus uliginosus* occurring in the Philadelphia area. *Torreyia* 22: 91-98. 1922.—*Sonchus uliginosus* Bieb., a species of the Caucasus region, first discovered in Pennsylvania by H. W. Pretz along a railroad embankment near Allentown on Sept. 22, 1917, has since been reported from many stations in Northampton, Lehigh, Bucks, and Philadelphia Counties in Pennsylvania and Newcastle County, Delaware, lying within a rectangle about 70 miles north and south by 30 miles east and west, with its center of frequency in Bucks Co. The species is thoroughly established, and threatens to become a persistent weed. The mode of introduction cannot be determined. This species has been reduced by some students to *S. arvensis* L. var. *glabrescens* Günth., Grab. & Wimm., but appears to be distinct.—J. C. Nelson.

3629. MACKENZIE, KENNETH K. The records of *Limnobia Spongia* in the northern United States. *Torrey* 22: 102-104. 1922.—*Limnobia Spongia* (Bosc) Richard, with its center of distribution in the southern United States, is an extremely rare and local plant in the northern States, where it has not been collected for nearly 25 years. Knieskern's report for New Jersey has not been confirmed. Three authentic specimens are known to exist from New York, 4 from Delaware, 1 from Virginia, 2 from Illinois and 4 from Missouri. No specimen from Indiana is known.—J. C. Nelson.

3630. MAIDEN, J. H. An alphabetical list of Victorian eucalypts. *Proc. Roy. Soc. Victoria*, (N. S.) 34: 73-84. 1922.—This supplements A Census of Victorian Eucalypts and Their Economics [Rept. Australian Assoc. Adv. Sci. 14: 294. 1913] by R. T. Baker. Sixty-two species are considered to be indigenous.—Eloise Gerry.

3631. MAIDEN, J. H. A few notes on the botany of Lord Howe Island (Sixth paper). *Proc. Linn. Soc. New South Wales* 45: 564-566. 1921.—The 1920 collections of J. L. Boorman and others for the National Herbarium, Sydney, are reported. These include known forms and a number of new records for the following presumably indigenous species: *Malvastrum tricuspidatum* A. Gray, *Erythraea australis* R. Br., *Mesembryanthemum australe* Sol., *Kyllinga monocephala* Rottb., *Adiantum formosum* R. Br., *Howea Forsteriana* Becc. (rachises and leaflets variegated). Characteristics of hybrid Howeas are discussed. New records for the following introduced plants are reported: *Ageratum conyzoides* L. (garden escape), *Galinsoga parviflora* Cav., *Aster subulatus* Michx., *Eupatorium cannabinum* L., *Sisymbrium officinale* L., *Stachys arvensis* L., *Datura Stramonium* L., *Nicotiana alata* Link & Otto (garden escape), *Daucus brachiatus* Sieb., *Asparagus plumosus* var. *nanus* Baker (garden escape), *Dactyloctenium aegyptiacum* Willd.—Eloise Gerry.

3632. MAIDEN, J. H. The forest flora of New South Wales. Vol. VII. Parts 61-70. p. i-xvii. John Spence: Sydney, 1922.—The author has issued a title-page and general index for Vol. VII of the above work.—J. M. Greenman.

3633. MENEZES, CARLOS A. DE. Subsídios para o estudo da Flora do Archipelago da Madeira. [Materials for the study of the Madeiran flora.] *Broteria Sér. Bot.* 20: 113-119. 1922.—This article aims to distinguish species or varieties not occurring in the Flora do Archipelago da Madeira (1914) and to correct errors in that work. Twenty species or varieties are mentioned, of which 13 represent new localities for, or introductions into the flora mentioned. The author proposes 6 forms as new: *Sinapidendron sempervivifolium*, *Ononis Costae*, *Sempervivum Barreti*, *Myosotis Welwitschii* Boiss. & Reut. var. *madeirensis*, *Semele androgyna* (L.) Kth. var. *macrophylla*, *Asparagus Loweii* Kth. var. *portomonizensis*.—E. B. Chamberlain.

3634. MOXLEY, GEORGE L. *Brickellia microphylla* (Nutt.) Gray. *Bull. Southern California Acad. Sci.* 20: 34-35. 1921.—Localities are given for this and other plants in southern California and a new combination, *Thelypteris Feei* (C. Chr.) Moxley (*Dryopteris Feei* C. Chr.) is made.—Roxana Stinchfield Ferris.

3635. NELSON, JAMES C. Additions to the flora of western Oregon during 1921.—*Torrey* 22: 98-102. 1922.—A list is presented of 28 species found growing spontaneously, of which 18 are introduced. The total number of species reported by the author which are not included in Piper & Beattie's Flora of the Northwest Coast has now reached 371. Corrections and range-extensions of 18 species previously reported are appended.—J. C. Nelson.

3636. PARKER, R. N. On the supposed occurrence of *Salix alba*, Linn. in the Northwest Himalaya. *Indian Forester* 48: 444-445, 1922.—The author states "that as far as known *S. alba* Linn. is not found, either wild or cultivated in N.-W. India."—E. N. Munns.

3637. RIKLI, M. Die arktisch-subarktischen Arten der Gattung *Phyllodoce* Salisb. [The Arctic-subarctic species of the genus *Phyllodoce* Salisb.] Vierteljahrsschr. Naturf. Ges. Zurich 66: 324-334. 15 fig. 1921.—The author presents a systematic treatment with descriptive notes and maps showing the distribution of the species.—*John H. Schaffner*.

3638. TOVEY, J. R. The Australian species of *Carex* in the National Herbarium of Victoria. Proc. Roy. Soc. Victoria (N. S.) 34: 42-48. 1921.—The systematic arrangement of Australian species of *Carex* according to Kükenthal in Engler's Pflanzenreich IV-20 (1909) is given, together with notes on the distribution of the species in the National Herbarium. This arrangement differs from Mueller's Census of Australian Plants.—*Eloise Gerry*.

3639. TOVEY, J. R., and P. F. MORRIS. Contributions from the National Herbarium of Victoria.—No. 1. Proc. Roy. Soc. Victoria (N. S.) 34: 207-212. Figs. 1-2. 1922.—Descriptions of 2 new species *Bossiaea Laidlawiana* (Leguminosae) and *Choretrum pendulum* (Santalaceae) are given together with several new records of regional distribution and the establishing of a new variety, *Helichrysum rosmarinifolium* Less. var. *ledifolium* (*H. ledifolium* Bth.) and a number of foreign plants in Victoria.—*Eloise Gerry*.

MISCELLANEOUS

B. E. LIVINGSTON, *Editor*

S. F. TRELEASE, *Assistant Editor*

3640. ANONYMOUS. Ten-year program of the New York Agricultural Experiment Station. Science 57: 16-17. 1923.

3641. CAMPBELL, ELMER GRANT. A pocket dissecting scope. Science 57: 179-180. 1923.—A new design is suggested and its advantages are noted. Two figures are given to show the parts in cross section.—*C. J. Lyon*.

3642. CONN, H. J. The preparation of staining solutions. Science 57: 15-16. 1923.—A request is made for the cooperation of biologists in putting the formulae of staining solutions on the basis of so many cc. of saturated solution per given volume of the desired solution.—*C. J. Lyon*.

3643. CONN, H. J. The standardization of biological stains. Science 57: 24-25. 1923.—Attention is called to the fact that this work is no longer carried on by the National Research Council, but by an independent commission.—*C. J. Lyon*.

3644. FONTANEL, P. Séchage des plantes pour l'herbiers. [The drying of plants for herbaria.] Sci. Agric. 3: 157-159, 192-193. 1922-23.—Methods of value in the drying of herbarium specimens are outlined.—*T. G. Major*.

3645. HILL, WM. H. Biochemical problems in agriculture as related to food. Sci. Agric. 3: 105-109. 1922.—A number of problems requiring study are suggested, including carbohydrate sources, manufacture and handling of desiccated fruits and vegetables, pectin from cull apples, value and rôle of yeast as a diet accessory, utilization of straw and sawdust for feeding purposes, and fibre-making possibilities of native grasses.—*T. G. Major*.

3646. MARTIN, GEORGE W. Food resources of the sea. Sci. Monthly 15: 455-480. 1922.—There is a limit to the number of human beings the earth can support. Not much has been done to utilize the food in the sea, especially the plants. In China and Japan and to a less extent in Europe a few of the algae are eaten. The plants of the sea must have mineral salts and light. The temperature is less variable than on land, and CO₂ is more plentiful. The benthos or shallow water group contains *Zostera marina*, a pondweed, and similar plants in

large quantities; *Ulva*, *Enteromorpha*, *Cladophora*, *Vaucheria*, *Lyngbya*, *Spirulina* are found in the shallow water, while *Fucus*, *Ascophyllum*, *Sargassum*, and other rock weeds where it is deeper. The *Laminarias* and their allies come in below tide level. In still deeper water the red algae appear along with others. The plankton contains many unicellular plants, especially the Diatoms and the Peridineae.—Peterson and his associates have concluded that the plankton plays little part in the nutrition of sea animals. These derive their food from the detritus of the sea bottom which is largely composed of the fine particles of decayed plants, primarily *Zostera*.—*L. Pace*.

3647. MOORE, BARRINGTON. **The proposed Roosevelt-Sequoia National Park and the Barbour bill.** *Science* 57: 82-84. 1923.—This is a defence of the Barbour bill against the attack made upon it in an article by Dr. Van Name (*Science* 56: 705-707. 1922). It is pointed out that the giant redwoods will receive as much protection as at present and that many scenic features will be added to the present Sequoia National Park, particularly in the nature of river canyons that are now threatened by water power development plans.—*C. J. Lyon*.

3648. VEITCH, ROBERT, and WILLIAM GREENWOOD. **The food plants or hosts of some Fijian insects.** *Proc. Linnean Soc. New South Wales* 46: 505-517. 1921.—In the investigation of sugar-cane pests in the Fiji Islands a number of food plant records were obtained for parasitic, predacious, and blood-sucking insects. About forty plants are included in the records.—*Eloise Gerry*.

3649. WOODFIN, J. C. **Vinegar making in small quantities.** *New Zealand Jour. Agric.* 24: 171-173. 1922.—Methods are described for making vinegar so as to retain flavor and keeping qualities.—*N. J. Giddings*.

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12

JULY-AUGUST, 1923

No. 6

ENTRIES 3650-4717

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 3726, 3736, 3738, 3761, 3796, 3800, 3803, 3815, 3868, 3966, 4003, 4266, 4331, 4356, 4409, 4423, 4434, 4435, 4581, 4608, 4613, 4616, 4621)

3650. ANONYMOUS. **Championship field wheat competition in the central-western district.** Agric. Gaz. New South Wales 34: 1-5. 1923.—The points judged were yield, cleanliness, appearance (30 points each), trueness to type, freedom from disease, and evenness (20 points each). Methods of cultivation are given.—*L. R. Waldron.*

3651. ANONYMOUS. **Championship field wheat competition in the Riverina.** Agric. Gaz. New South Wales 34: 81-84. 1923.—Crops were scored on apparent yield, trueness to type, freedom from disease, evenness, cleanliness, condition and appearance. A field sown to Federation secured first place.—*L. R. Waldron.*

3652. ANONYMOUS. **Electro-culture.** Jour. Ministry Agric. Great Britain 29: 792-796. 1922.—A general summary is given of the results of field experiments from 1915 to 1920 on the influence of electrical discharge on plant growth, the work from 1918 on being under the direction of the Electro-Culture Committee.—“ * * * Of the fourteen positive results of experiments extending over six years, only three are less than 10 per cent, while of the four negative results none reaches 10 per cent. Of the ten positive results with spring sown cereals only two are less than 10 per cent, and six show an increase of 30 per cent, or over; while of the two negative results both show decreases of less than 10 per cent. The results of field experiments with these spring crops show an average increase of 22 per cent. The effect of electrification in increasing the yield of spring-sown oats and barley has thus been demonstrated. A beneficial effect on clover-hay is probable, while that on winter-sown wheat is uncertain.”—Alternating current is usually as effective as, or more effective than, direct current. An upward current through the plant increases growth in the same way as a downward current. A discharge applied for the first month only of the growing season may be at least as effective as one continued throughout the growing season.—*M. B. McKay.*

3653. ANONYMOUS. **Lumber from sugar-cane waste.** Sci. Amer. 126: 398. 1922.—The lumber, “celotex,” is made from the cane fiber, or bagasse, remaining after the juice has been extracted. It is waterproof and has high insulating qualities, making it useful in the manufacture of refrigerators, fireless cookers, the walls of storage plants, etc. It also has many uses in house construction.—*Chas. H. Otis.*

3654. ANONYMOUS. **The regrassing experiments in Central Otago.** New Zealand Jour. Agric. 26: 97-100. 1 fig. 1923.—A report by a special committee is presented concerning results of experiments outlined in Vol. 26 of the Journal.—*N. J. Giddings.*

3655. ANDERSON, B. G. **Experiments with dark tobacco and other crops.** Virginia Agric. Exp. Sta. Bull. 231. 19 p., 4 fig. 1923.—Soil management, fertilizing, liming, and choice of varieties for dark tobacco and other field crops, grown in experimental plots at Appomattox, Virginia, are discussed.—*F. D. Fromme.*

3656. ATKINSON, ESMOND H. **Weeds and their identification.** New Zealand Jour. Agric. 25: 290-292. 1 fig. 1922.—Field horsetail, *Equisetum arvense*, is an introduced weed which may cause trouble. The plant is described in some detail.—*N. J. Giddings.*

3657. ATKINSON, ESMOND H. **Weeds and their identification.** New Zealand Jour. Agric. 25: 351-353. 1 fig. 1922.—Japanese wineberry, *Rubus phoenicolasius* Maxim, is described as a weed in some localities. It should be comparatively easy to eradicate.—*N. J. Giddings.*

3658. ATKINSON, ESMOND H. **Weeds and their identification.** New Zealand Jour. Agric. 24: 360-364. 2 fig. 1922.—Cape honey flower (*Melianthus major* L.), originally introduced from South Africa, has found favorable conditions for growth and spread in New Zealand. It has been declared a weed. The plant is described in some detail.—*N. J. Giddings.*

3659. BAILEY, E. M. **Commercial feeding stuffs.** Connecticut Agric. Exp. Sta. Bull. 238. 329-361. 1922.—This bulletin reports the analyses of 159 official samples of feeding stuffs taken by the Station Agent and 57 samples submitted by individuals. A table is included giving coefficients of digestibility and net energy values of the feeding stuffs analyzed.—*Henry Dorsey.*

3660. BARNUM, CLYDE C. **The control of wild morning glory.** California Agric. Exp. Sta. Circ. 256. 22 p., 12 fig. 1923.—The persistent growth of this plant after repeated cuttings is due to the large food reserves in the roots, which must be exhausted in order to kill the plant. Thorough cultivation during 1 growing season kills the plant in 1 year. The interval between cuttings should not be longer than 5 days, thus precluding the appearance of green leaves. Alfalfa, which yields profitable crops at the same time may kill out morning glory in 2-3 years, but straw or other cover does not check its growth. Hogs sometimes kill out morning glory by eating its roots, a method used extensively in the eastern states. Sheep aid by grazing on green parts of the plant. Salt brine kills the weed, but is recommended only for soil not used for growing crops. The use of sodium arsenite is not justified by the present investigations. Commercial weed-killers, largely solutions of sodium arsenite, are too expensive and it is not known just when they should be applied. For small patches carbon bisulfid is very satisfactory.—*A. R. C. Haas.*

3661. BARTLETT, H. **Wheat crop competition, 1922.** Forbes and Parks P. and A. associations. Agric. Gaz. New South Wales 34: 15-23. 1923.—A general discussion of the contests is presented, emphasizing particularly the importance of fallowing, value of superphosphate, methods of cultivation, varieties, and seasonal conditions. Marshall's No. 3, Yandilla King, Canberra, and Hard Federation were the leading varieties. Contestants were scored on yield, type and purity, freedom from disease, evenness, cleanliness, and condition and appearance. Foot-rot and take-all are spreading and are expected to cause increased losses in the future.—*L. R. Waldron.*

3662. BEVAN, W. **Chemical fertilizers.** Cyprus Agr. Jour. 18: 1-7. 1923.—It is claimed that the importation of commercial fertilizers has very materially increased during 1922. As considerations in using chemical manures, the author emphasizes manner and time of

application and quantity and type to be applied. Suggested amounts are given in tabular form for each agricultural crop.—*W. Stuart.*

3663. BEVAN, W. **Comfrey: A prolific forage crop.** *Cyprus Agric. Jour.* 18: 7-8. 1923.—Comfrey is claimed to be native on the slopes of the Caucasian Mountains. The usual practice is to propagate from sets or from rooted plants. First year yields sometimes equal 50 tons per acre. Plants should not be allowed to flower. Cures of milk fever, foot-and-mouth disease wounds, etc., are ascribed to comfrey.—*W. Stuart.*

3664. BEVAN, W. **Ground nut cultivation in Cyprus.** *Cyprus Agric. Jour.* 18: 13. 1923.—Successful production by the Cyprus Agricultural Department, has resulted in commercial growing. It is claimed that the Cyprus grown nuts are usually much superior in shape, size, and flavor to those imported from Egypt, and that as a result an export trade to Egypt is developing.—*W. Stuart.*

3665. BLAKELY, W. F. **Weeds of New South Wales.** *Agric. Gaz. New South Wales* 34: 116-120. 2 fig. 1923.—*Cleome spinosa* and *Silene quinquevulnera* are discussed and means of control are suggested.—*L. R. Waldron.*

3666. BROWN, H. B., and J. F. O'KELLY. **Report of the agronomy department.** *Ann. Rept. Mississippi Agric. Exp. Sta.* 34: 16-22. 1921.—No consistent gain has resulted from any form or quantity of lime in a rotation of cotton, corn, and oats followed by a legume. In crop rotation work, plots cropped to corn continuously with cowpeas at last cultivation gave an increase of 7.7 bushels of corn over plots without the legume. Cowpeas and residual effect of 5 tons manure per acre applied the year before gave an increase of 9.8 bushels corn per acre on soil naturally poorer than the check plot. Plots in cotton continuously yielded 767 pounds more seed cotton to the acre where 5 tons manure were applied annually.—*J. F. O'Kelly.*

3667. CAUTHEN, E. F. **Comparison of peanut meal, cotton seed meal, velvet bean meal, ammonium sulphate, and nitrate of soda, as fertilizers for corn and cotton.** *Alabama Agric. Exp. Sta. Bull.* 215. 8 p. 1921.—Yields from 3 tests with cotton and 2 with corn indicate that the effectiveness of these fertilizers as sources of nitrogen increases in the following order: velvet bean meal, 54; peanut meal, 87; cotton seed meal, 80; sulphate of ammonia (for corn only), 94; nitrate of soda, 100.—*W. A. Gardner.*

3668. COCKAYNE, L. **An economic investigation of the Montane Tussock-grassland of New Zealand.** *New Zealand Jour. Agric.* 24: 321-334; 25: 1-11, 129-144. 16 fig. 1922.—The area under consideration consists of more than a half million acres at the base of the mountains and extending to an elevation of 3000 feet. It formerly supported a fairly dense cover of tussock grasses and various other plants which are listed. At present the land is largely barren dunes and the flora is very limited. The area has a limited rainfall, reported as not more than 14 inches in the most arid portions. The sun is bright and temperatures above 100°F. are frequent in summer. There are also violent winds which accelerate evaporation and are an important factor in erosion. The soil is comparatively rich. Excessive sheep grazing and burning combined with the depredations of rabbits destroyed many of the better forage plants and broke up the soil cover so that barren areas resulted. Experiments were designed to find out the principles, methods, and suitable plants upon which regrassing depends and whether regrassing can be accomplished. Seed was sown with and without harrowing. Spring and fall seedings were tried. The plots were located at altitudes of 1000-3000 feet, and included 1 part of the most seriously depleted area. A portion of each plot was not sown to determine whether locally growing plants might help materially in the regrassing. Some sowing was also done outside the enclosures. Merely keeping the land free from live stock did not give favorable results. Seed of the following plants appear to be well established at the end of the 2nd season: Chewings fescue (*Festuca rubra*), cocksfoot (*Dactylis glomerata*), tall

fescue (*Festuca elatior*), chicory (*Cichorium intybus*), lucerne (*Medicago sativa*), and yarrow (*Achillea millefolium*).—*N. J. Giddings*.

3669. COMMITTEE ON THE STANDARDIZATION OF FIELD EXPERIMENTS. Bibliography of standardization of field experiments. Jour. Amer. Soc. Agron. 15: 33-40. 1923.—The references (155) are cited which were presented as part of a report at the meeting of the Society held at Washington, D. C., Nov. 21, 1922.—*F. M. Schertz*.

3670. CROOKS, J. T. J. The possibilities of Assam as a sugar-producing country. Internat. Sugar Jour. 25: 176-178. 1923.—A brief description is given of the soil, climate, vegetation, pests, and labor conditions. A few varieties of cane are grown commercially, principally seedlings from Java, Barbados, and Mauritius. These are not very successful and suggestions are made for experimenting with some of the seedling canes produced at the Coimbatore station in India such as CO 213, CO 214, and others.—*Caroline Rumbold*.

3671. DE BAUFRE, WM. L. The heating value of corn. Jour. Amer. Soc. Agron. 15: 1-6. 1923.—The heating value of Nebraska corn (10 per cent moisture) is approximately 6,700 B. t. u. per pound while the corresponding value for Pittsburg, Kansas coal is 11,800 per pound. Consequently the heating value of 50 bushels of corn on the cob, or of 63 bushels of shelled corn, is about equivalent to 1 ton of bituminous coal.—*F. M. Schertz*.

3672. DORPF-PETERSEN, K. Beretning fra Statsfrøkontrollen for det 51 Arbejdsaar. [Report of the State Control Station for the 51st year.] Tidsskr. Planteavl 28: 668-731. 1922.—This report deals particularly with the clover and grass seed situation in Denmark from July 1, 1921, to June 30, 1922. Voluminous statistics are presented.—*Albert A. Hansen*.

3673. DOWNING, R. G. Field experiments with winter fodders. Grafton experiment farm. Agric. Gaz. New South Wales 34: 39-40. 1923.—Sunrise oats and vetches or peas have been found the most satisfactory combination for winter feed, resulting in an increased yield per acre of more than 2 tons over oats alone. Vetches and peas give about equal results when averaged over a period of years in combination with the cereals. Barley makes too slow a growth compared with oats and wheat and consequently gives a lessened yield. An application of 100 pounds of superphosphate per acre has been the best manurial treatment, giving a net profit of over £1 per acre.—*L. R. Waldron*.

3674. DUNSHEE, CARROLL F. Results of rice experiments in 1922. California Agric. Exp. Sta. Bull. 354. 401-415. 1923.—In plots submerged 8 inches no barnyard grass (*Echinochloa crus-galli*) appeared above the surface of the water. There was a scattering of the grass in the plots submerged 6 inches while a considerable quantity came through 4 inches of water. Plots submerged 2 inches were very foul with barnyard grass. Water weeds other than the various types of barnyard grass were not controlled to any extent by continuous submergence.—Plots submerged immediately after being drilled yielded a very inferior stand. Early seeding dates furnished most favorable conditions for increased yields. When land is free from alkali, little change occurs in the water by passing over the rice fields; but when soil contains soluble salts or alkali, some of this matter is carried away in drainage. How much goes into the subsoil is not known. Rice culture during 4 preceding years has not removed enough of the alkali to make the soil safe for sensitive crops.—*A. R. C. Haas*.

3675. FERRIS, E. B. Cotton experiments, 1922. Mississippi Agric. Exp. Sta. Circ. 46. 8 p. 1923.—Comparative results are given of standard varieties grown on the sandy loam soils of South Mississippi. Nitrates, as usual on these soils, produced profitable gains. Acid phosphate produced considerable increase but basic slag and raw phosphate rock were less efficient. A significant increase was produced by kainit and the leaves of the plants on the kainit plots were retained much better than on plots receiving no kainit. The increases due to sulphate of potash and to the double sulphate of potash and magnesia were practically the same.—*J. F. O'Kelly*.

3676. FOY, NELSON R. **Agricultural root seeds.** New Zealand Jour. Agric. 25: 293-296. 2 fig. 1922.—The germination, purity, size and color, and adulteration of the seed of cultivated species of *Brassica* are discussed.—N. J. Giddings.

3677. FOY, NELSON R. **Cocksfoot seed.** New Zealand Jour. Agric. 25: 165-167. 1 fig. 1922.—A report is presented on production, germination, weight, and purity of the seed of *Dactylis glomerata*.—N. J. Giddings.

3678. FOY, NELSON R. **Modern seed testing.** New Zealand Jour. Agric. 26: 65-72. 6 fig. 1923.—Equipment and methods of seed testing used in the New Zealand inspection work are described.—N. J. Giddings.

3679. FOY, NELSON R. **Seed testing notes.** New Zealand Jour. Agric. 24: 299-301. 1 fig. 1922.—Perennial rye grass, *Lolium perenne*, is discussed as to its germination, impurities, adulteration, and weight.—N. J. Giddings.

3680. FOY, NELSON R. **Seed testing notes. "Cheap" mixtures.** New Zealand Jour. Agric. 24: 224-225. 1922.—The author gives an analysis of a cheap, bargain mixture to show the worthlessness and expensiveness of such seed.—N. J. Giddings.

3681. GARDNER, F. D., C. F. NOLL, and R. D. LEWIS. **Forty years' results with fertilizers. General fertilizer experiments.** Pennsylvania Agric. Exp. Sta. Bull. 175. 23 p., 3 fig. 1922.—The author tabulates and summarizes the data from experiments initiated in 1882, the plan consisting in 144 1-acre plots arranged in 4 tiers. The plots are separated by 2-foot strips of blue-grass sod and the tiers by grass roadways. The crops grown are corn, oats, wheat, and mixed clover and timothy, each 1 year. On the 4 tiers there are growing all 4 crops each year. The plot treatments regarding cultivation, seeding, etc., conform to those of good farm practice, all plots receiving the same treatment except as to materials applied. Except burnt lime, which was applied only once in 4 years to corn, the fertilizers have been applied on alternate years to corn and wheat, the oats, clover and timothy receiving nothing. Mixed horse and cow manures with litter have been applied to sod before corn at irregular periods in the spring, and in the fall to oat stubble before winter wheat, but for any given application the manure has been of one kind and uniform. Nitrogen, in the form of nitrate of soda, dried blood, and sulphate of ammonia, has been applied at 24, 48, and 72 pounds an acre. Account has been taken of the phosphoric acid in the dried blood. Phosphoric acid has been applied uniformly at 48 pounds an acre. Muriate of potash has been applied to corn at the rate of 200 pounds an acre, with burnt lime at the rate of 2 tons an acre once in 4 years and with ground limestone at the same rate, applied on alternate years to corn and wheat.—The results show that the average yield of the untreated plots for the past 8 years has been only 57.6 per cent of that during the first 8 years of the experiment. Phosphoric acid is the first limiting factor in this soil, which is mainly a Hagerstown silt loam, and until this element is supplied, potash and nitrogen give little increase in yields. Plots receiving phosphoric acid alone have yielded 43.8 per cent more than the nearest checks. Potash alone has increased yields but 13.8 per cent, but when added to phosphoric acid has given an increase of 29.6 per cent over phosphoric acid alone. The authors believe that half the amount of potash used would have given as good results. Phosphoric acid and potash without nitrogen have given a greater net return than combinations including nitrogen and have practically maintained the fertility for the duration of the experiment. Nitrogen at 24 pounds per acre has not increased yields when used alone or in combination with any fertilizers. Possibly a lower rate of nitrogen application would have given a profit. Increasing nitrogen to 48 and 72 pounds has increased yields (except in the case of sulphate of ammonia) but not enough to affect the additional cost of the fertilizers. Nitrate of soda has slightly outyielded dried blood and greatly outyielded sulphate of ammonia. It is considered that the low yields accompanying sulphate of ammonia are due to the acidity induced by this fertilizer. At \$1.50 a ton, a 6-ton application of manure on alternate years has given greater net returns

than any commercial fertilizer combination. Manure at \$1.87 a ton gives a net return equivalent to that for the phosphoric acid and potash plots. The 8- and 10-ton applications of manure have not given profitable returns. Burnt lime at 2 tons an acre once in 4 years and ground limestone at the same rate once in 2 years on plots receiving no commercial fertilizer or manure have each caused a slight increase in yield and in crop value. Burnt lime with 6 tons of manure has increased the yields over lime alone. Land plaster at the rate of 320 pounds an acre every 2 years has not appreciably increased yields. Computations are made showing the relative advantage of one treatment over another.—*C. R. Orton.*

3682. GEORGI, C. D. V. **Castor oil seeds. A note on oil content and extraction of oil.** *Malayan Agric. Jour.* 10: 191-192. 1922.—The amount of oil in locally grown seed is given and the constants found.—*I. H. Burkill.*

3683. HANSEN, ALBERT A. **The toll of weeds in Indiana.** *Proc. Indiana Acad. Sci.* 1921: 105-109. 1922.—The losses are estimated under such headings as, tillage loss, reduced yield, cutting roadside weeds, etc. The total weed loss in Indiana for 1920 is estimated at \$44,072,870 or \$14 per capita per year. Correctives are summed up under 10 suggestions, including use of pure viable seed, killing weeds before maturity, clean cultivation, and cooperation among farmers.—*F. C. Anderson.*

3684. HARDY, H. C. **Burning up the corn.** *Sci. Amer.* 126: 244. 1922.—The use of corn as a source of heat when coal is high in price is discussed.—*Chas. H. Otis.*

3685. HAYWOOD, A. H. **Dairying under North Coast conditions.** *Agric. Gaz. New South Wales* 34: 41-48. 1923.—Various methods are suggested for the production of dry and succulent fodder crops to be used during the winter season.—*L. R. Waldron.*

3686. HAYWOOD, A. H. **Sugar-cane as fodder.** *Agric. Gaz. New South Wales* 34: 100-102. 1923.—Notes are given on different varieties and suggestions are made as to methods of feeding.—*L. R. Waldron.*

3687. HERTEL, H. **Landbruget i 1922.** [Agriculture during 1922.] *Tidsskr. Landoekonomi* 1923¹: 1-40. 1923.—This survey includes damage due to insects, etc. Seed from America is reported as of poor quality, principally because of the lack of proper recleaning before shipping. Nevertheless, American clover, timothy, and other grass seed are considered better than much of the seed imported from Germany.—*Albert A. Hansen.*

3688. IVERSEN, KARSTEN. **Beretning fra Statens Forsøgsvirksomhed i Plantekultur.** [Report from the State Agricultural Experiment Station.] *Tidsskr. Planteavl* 28: 571-589. 1922.—The author reports on experiments from 1907 to 1910 in growing corn in Denmark for silage purposes. The preliminary work was not successful, but experiments will be continued.—*Albert A. Hansen.*

3689. KENNEDY, P. B. **Leguminous plants as organic fertilizers in California agriculture.** *California Agric. Exp. Sta. Circ.* 255. 8 p. 1922.—The author points out the advantages and desirability of growing leguminous plants as organic fertilizers in California.—*A. R. C. Haas.*

3690. KENNEDY, P. B. **The small-seeded horse bean.** *California Agric. Exp. Sta. Circ.* 257. 23 p., 1 pl., 14 fig. 1923.—The small-seeded horse bean is recommended as a valuable winter green manure crop, and to a less extent as a hay, silage, and seed crop for feeding livestock.—*A. R. C. Haas.*

3691. KOFAHL. **Zur Stickstoffdüngung der Schmetterlingsblütler.** [Fertilizing legumes with nitrates.] *Mitteil. Deutsch. Landw. Ges.* 38: 66. 1923.—Treating lucerne with nitrate

of soda and peas and lupines with ammonium chloride was without noticeable effect.—*A. J. Pieters.*

3692. LEIJNS, J. J. Onze rijstcultuur. [Our rice growing.] West Indië 4: 147-157. 1919.—A comparison is made of rice growing in the U. S. A. and in Surinam. Growing, harvesting, and thrashing are described.—*J. C. Th. Uphof.*

3693. LITTLE, L. G. Lucerne top-dressing experiments. Five years' trial at Glen Innes experiment farm. Agric. Gaz. New South Wales 34: 37-38. 1923.—Phosphoric acid and potash gave net positive results in all cases. The largest net gain was obtained from 200 pounds of superphosphate per acre.—*L. R. Waldron.*

3694. LITTLE, L. G. Wheat variety trials at Cowra. Agric. Gaz. New South Wales 34: 92. 1923.—The standard variety, Hard Federation, was outyielded by some of the newer and yet unnamed varieties.—*L. R. Waldron.*

3695. LONG, W. P. Hubam in British Columbia. Gleanings in Bee Culture 50: 88. Fig. 1-2. 1922.—Hubam clover on a trial plot at Vancouver seeded May 1. By July 17 it had made a growth of 4-5 feet and was beginning to bloom.—*J. H. Lovell.*

3696. LOWY, B. Conserving crops by fumigation. Sci. Amer. 127: 313. 1922.—The article concerns the use of carbon bisulfide and hydrocyanic acid gas for eliminating insects from rice and wheat in storage.—*Chas. H. Otis.*

3697. McDONALD, A. H. E. Wheat growing for profit. Agric. Gaz. New South Wales 34: 104. 1923.—Wheat growing is probably the most profitable type of farming in Australia.—*L. R. Waldron.*

3698. MAKIN, R. N., and E. S. CLAYTON. Farmers' experiment plots. Winter green fodder experiments, 1922. Agric. Gaz. New South Wales 34: 85-92. 2 fig. 1923.—Crops grown were wheat, oats, barley and rye and in some instances peas and vetches. The maximum yield of 17 tons was secured from Warden wheat and Golden vetches at Kyogle. Use of phosphates generally produced significantly increased yields.—*L. R. Waldron.*

3699. MARTIN, F. J., and R. E. MESSEY. Experiments on wheat growing in the Sudan. Wellcome Tropic. Res. Lab. Khartoum, Chem. Sec. Publ. 19. 24 p. 1921.—Over 30,000 acres of wheat are grown in the Sudan, mainly in the provinces of Dongola and Berber. Annual precipitation at Khartoum is 4.9 inches; about 6 irrigations of 4½ inches each are applied to the wheat crop. The soil at Khartoum, not considered heavy, contains over 40 per cent of clay. The native wheat is undesirable because of its long growing season, making it liable to attacks of stem rust (*Puccinia graminis*). Pure line selections were made of native wheats and varieties were imported from other countries. Only the earlier varieties, from Australia, India, and Egypt, have given good results. Even Egyptian varieties are rather late. The best yielding varieties were Firbank and Federation from Australia at about 35 bushels per acre; the native varieties yielded only 25 bushels. Full agronomic notes are given. The thrashed grain was hard and brittle, containing but 8-10 per cent of moisture and weighing up to 70 pounds per bushel. The milled flour was rather dark in all cases owing to primitive milling methods. Determinations were made of protein, dry and wet gluten, gliadin, glutenin, and diastatic capacity. Protein content varied from 9.8 to 10.9 per cent. Diastatic capacity was low. Baking results showed several of the wheats, including 2 native wheats, to produce loaves very nearly as large as those made from roller-milled Australian flour. The varieties Firbank, Federation, and Indian No. 40 are recommended. These varieties show less strength than the best American or Russian wheats. The Sudan climate shortens the growing period of wheats.—*L. R. Waldron.*

3700. MAY, R. G. Sudan grass in the Bathurst district. *Agric. Gaz. New South Wales* 34: 33. 1923.—Proper rate of seeding Sudan grass has been found to be 10 pounds per acre in rows 14 inches apart.—*L. R. Waldron.*

3701. MORTIFEE, A. Observations on Uba cane. *South African Sugar Jour.* 7: 34–45. 1923.—Certain factors make the Uba cane desirable for cultivation in Zululand. It is very hardy, resistant to drought in the higher lands and to floods on the Umfolozi flats, and has unusual ratooning qualities. A peculiarity of the variety is its production of “bull shoots,” extremely vigorous and rapid growing shoots which usually appear 8–9 months after cutting. An abnormal increase in moisture causes an increase in the number of these shoots. They contain less sucrose than the plant cane.—*C. Rumbold.*

3702. NOLTE, O. Beiträge zur Kenntnis der Ernährung der Schmetterlingsblütler. [Contribution to the knowledge of the nutrition of legumes.] *Mitteil. Deutsch. Landw. Ges.* 38: 78–80. 1923.—Varying quantities of nitrogenous fertilizer, mostly sulphate of ammonia, were applied to lupine, serradella, beans, peas, red clover and lucerne. No effect was noted on the 1st 3, but with the last 3 there were some increases. Increases were most pronounced with urea.—*A. J. Pieters.*

3703. O'KELLY, J. F., and ROWLAND COWART. Cotton experiments, 1922. *Mississippi Agric. Exp. Sta. Circ.* 45. 8 p. 1922.—Results are given of standard and new varieties grown on valley, hill, and wilt-infected soil. The average values of the increase for 2 years due to the application of 15 pounds available nitrogen per acre from different carriers are reported as \$12.82 for ammonium sulphate, \$12.67 for nitrate of soda, \$9.95 for calcium cyanamid, and \$1.60 for cottonseed meal.—*J. F. O'Kelly.*

3704. O'KELLY, J. F., and ROWLAND COWART. Corn experiments, 1922. *Mississippi Agric. Exp. Sta. Circ.* 47. 8 p. 1923.—Comparative yields of standard and new corn varieties on valley and hill soils and 3 years' results from the use of nitrates under corn are reported. The use of 15 and 30 pounds of available nitrogen per acre from ammonium sulphate, nitrate of soda, or calcium cyanamid was profitable only in seasons of ample rainfall.—*J. F. O'Kelly.*

3705. OPITZ. Versuche über Einwirkung starker Stickstoffdüngung auf den Anbauwert der Kartoffeln. [Investigations on the effect of heavy nitrogenous fertilizing on the propagating value of potatoes.] *Mitteil. Deutsch. Landw. Ges.* 38: 75–78. 1923.—Five varieties of potatoes were grown (1) on a reasonably fertile field, (2) with heavy excess of ammonium sulphate and nitrate of soda. In practically every case the seed stock from the field heavily fertilized gave smaller returns and showed more diseased hills.—*A. J. Pieters.*

3706. PATTERSON, T. H. The northern gum lands. *New Zealand Jour. Agric.* 25: 321–333. 3 fig. 1922.—Results to date indicate that these lands may be successfully and profitably farmed by proper methods. Drainage is often necessary and the land should then be lined. Deep cultivation must be practiced. The soil should not be too fine on top. Detailed data on the different experimental plots are given.—*N. J. Giddings.*

3707. PIPER, CHARLES V., and WILLIAM J. MORSE. The soybean. 339 p., 84 fig. McGraw-Hill Book Co., Inc.: New York & London, 1923.—The authors aim to present all facts now known about this important economic crop, and to emphasize its value as a human food. The soybean is discussed with relation to its commercial status, botanical history, agricultural history, culture, harvesting and storage, composition, utilization, varieties, structure of seed, oil content, soybean cake or meal, soybean products for human food, table dishes of soybeans and soybean products, and enemies. A bibliography of 600 titles is appended.—*Mary R. Burr.*

3708. REMH, TH. *Beobachtungen über Gaswasserdüngung*. [Observations on fertilizing with gaswater.] *Mitteil. Deutsch. Landw. Ges.* 38: 106-108. 1923.—Gaswater containing 1.1-2.21 per cent nitrogen as ammonia was applied as top dressing to meadows and broadcasted on land in preparation for mangels. Except where the gaswater was considerably diluted an initial injury to the grass was noted, but this injury was overcome and the plots fertilized yielded increases amounting to about 75 per cent of those on check plots treated with ammonium sulphate. Gaswater is recommended, but only in the immediate vicinity of factories as the value of the fertilizer does not warrant high transportation costs.—A. J. Pieters.

3709. SAMSON, HAROLD W. *United States grades for potatoes*. U. S. Dept. Agric. Circ. 238. 4 p. 1922.—Grading standards recommended by the Department of Agriculture and the U. S. Food Administration in 1917 with a few minor changes recommended in 1919 have proved so satisfactory that they are being generally adopted, and by many states as the official standard. Further slight revision is made by the adding of a U. S. No. 1 small grade. The 4 grades are fully described and included terms defined.—P. L. Ricker.

3710. SCHNEIDER. *Die Bewirtschaftung der Wiesen und Weiden unter Berücksichtigung der wirtschaftlichen Seite in Bezug auf Viehzucht und Viehhaltung*. [The management of meadows and pastures considered economically with respect to cattle breeding and cattle raising.] *Mitteil. Deutsch. Landw. Ges.* 38: 117-118. 1923.—The price of hay in Germany has increased 5,-7,000 fold since 1913, but prices of potatoes and sugar beets have risen only 4-500 fold. This shows Germany's dependence upon imported feeds. The remedy is in better crops resulting from a careful study of meadows and pastures.—A. J. Pieters.

3711. SHATTUCK, OBIL, and DOUGLAS W. RITCHIE. *Growing crops in Harney Valley*. Oregon Agric. Exp. Sta. Bull. 191. 24 p., 15 fig. 1922.—A discussion is given of methods of irrigation and crops adapted to this Oregon region. The different irrigation systems mentioned are: the "border system," "check system," "corrugation system," "furrow system," and "sub-irrigation."—Small cereals and forage crops such as alfalfa, field peas, clovers, and sunflowers do best. Potatoes and root crops can be grown but are not as reliable as cereals and forage crops.—C. E. Owens.

3712. SKUDERNA, A. W., and C. E. MICKEL. *The report of experimental work and field observations in investigating and factors affecting the sugar content and purity of sugar beets*. Season 1921. 119 p. [mimeographed], illus. American Beet Sugar Co.: Arkansas Valley, Colorado. 1922.—A résumé of the weather during 1921 is given and its effects on the crop. Effects are recorded of varying methods in cultivation especially fall plowing, rotation of crops, and thinning, on quality and yield of sugar beets. Analyses of soils, water and fertilizer experiments, sugar beet variety tests, experimental beet seed raising, and notes on treated seed follow. In 1921 there was a severe epidemic of leafspot (*Cercospora beticola*). The observations on this leafspot are connected with the different phases of the experimental work and form a commentary on the conditions which increased and diminished the virulence of the disease. There are observations on fungous diseases of minor importance, insect pests, and field losses prior to and after topping the beets and using different methods of ensiling the roots.—C. Rumbold.

3713. S[OUTH], F. W. *The eradication of sensitive plant, Mimosa pudica*. Malayan Agric. Jour. 10: 237. 1923.—It is shown that spraying with sodium arsenite kills that part of the plant which is above ground but does not kill the root, which sprouts again.—I. H. Burkill.

3714. STEPHENS, D. E., and G. R. HYSLOP. *Wheat growing after fallow in eastern Oregon*. Oregon Agric. Exp. Sta. Bull. 190. 35 p., 13 fig. 1922.—Best practices as to preparation of the soil, seed treatment, time, rate and depth of seeding, cultivation, and best varieties are discussed.—C. E. Owens.

3715. STILES, E. P. **The coast country and clover.** Beekeepers' Item 6: 45-46. 1922.—White clover (*Trifolium repens*) is spreading in the coast country of Texas, but it attracts very few honey bees. The soil of the upper Texas coast country is largely a heavy black clay and is often acid. If heavy liming would make it possible to grow white sweet clover (*Melilotus alba*), the value of the land would be greatly increased.—J. H. Lovell.

3716. STOA, THEODORE E. **Varietal trials with oats in North Dakota.** North Dakota Agric. Exp. Sta. Bull. 164. 46 p., 6 fig. 1922.—Varietal trials with oats are reported for North Dakota from 7 localities covering periods varying from 2 to 21 years. Mid-season varieties are generally better adapted than either early or late varieties. In the southern portion, early varieties frequently do as well or better than mid-season varieties. Late varieties do well only in northeastern North Dakota. Sixty-day and Kherson are the leading early varieties; Lincoln, Victory, and Siberian are leading mid-season varieties; and White Russian and White Tartarian are the best late varieties. Differences among varieties within any group are not important. While yield of straw is closely associated with height of plant, this yield varies greatly from year to year. Early varieties mature in 75-80 days from emergence. Mid-season varieties require about 10, late varieties 20 additional days for maturity. Early variety oats generally weigh least per bushel. Under normal conditions, oats grown in western North Dakota weigh more than those grown in the eastern portion of the state. Swedish Select, a mid-season variety commonly grown, does not yield well and is rather susceptible to stem rust.—L. R. Waldron.

3717. TESDORFF, A. **Oversigt. [Supervision.]** Tidsskr. Landokonomi 1922¹²: 567-577. 1922.—The report concerns the activities of the Danish agricultural Society from Oct., 1921, to Oct., 1922, particularly toward securing the enactment of agricultural legislation.—Albert A. Hansen.

3718. TICE, C. **Potato improvement work in B. C.** Agric. Jour. [British Columbia] 7: 272-273; 8: 11, 15. 1923.—The author deals chiefly with seed certification.—J. W. Eastham.

3719. WALDRON, L. R., T. E. STOA, and C. E. MANGELS. **Kota wheat.** North Dakota Agric. Exp. Sta. Circ. 19. 10 p., 4 fig. 1922.—Kota is a bearded, hard, red, spring wheat, resistant to stem rust. For periods of from 1 to 5 years at 7 points in North Dakota, Kota has outyielded Marquis 15.6 per cent. Comparative baking and milling data are given for Kota and Marquis wheats.—L. R. Waldron.

3720. WARD, F. E. **Cocksfoot seed production.** New Zealand Jour. Agric. 25: 18-19. 1 fig. 1922.—A successful trial of the Danish system at Ashburton Experimental Farm is reported.—N. J. Giddings.

3721. WENHOLZ, H. **Varieties of maize in New South Wales.** Agric. Gaz. New South Wales 34: 27-33. 4 fig. 1923.—The varieties Yellow Hogan, Manning Silvermine, Golden Superb, and Golden Glow are illustrated and the adaptation of the varieties is discussed with reference to different localities in New South Wales.—L. R. Waldron.

3722. WESTER, P. J. **Adlay, a new grain plant from the Orient.** Jour. Heredity 13: 221-227. 6 fig. 1922.—Adlay is the native Philippine name for Job's Tears (*Coix lachrymajobi* L.). While primitive tribes in the Philippines have long used the plant for grain, the author was surprised at the prolificacy of some strains. Seed was taken to Manila, where yields of 3,230 pounds to the acre were obtained. Milling tests in Manila and Washington, D. C., have proved that the grain is adapted for use with modern machinery, and when mixed with $\frac{1}{3}$ flour makes very acceptable bread. Since adlay yields fully as much as rice and does not require flooded paddies for culture, it is suggested that it may become an important tropical grain crop.—R. C. Cook.

3723. WHITTET, J. N. Kikuyu grass in bracken fern country. Agric. Gaz. New South Wales 34: 24-26. 2 fig. 1923.—When Kikuyu grass [*Pennisetum longistylum*] is planted at 3-foot intervals in drills plowed 3 feet apart in bracken fern areas, it quite smothers out the fern. The grass resists frosts and affords valuable pasture.—L. R. Waldron.

3724. WHITTET, J. N. Winter grasses in the Penrith district. Agric. Gaz. New South Wales 34: 103-104. 1 fig. 1923.—Three plats were sown with various grass mixtures and legumes. *Avena elatior* was eaten with most avidity and *Phalaris bulbosa* ranked 1st in growth and frost resistance.—L. R. Waldron.

3725. WINKLER, E. A. Hubam as a farm crop. Gleanings in Bee Culture 50: 762-763. Fig. 1-2. 1922.—The stalks and roots of the annual white sweet clover, or Hubam clover, are nearly as large as those of the biennial species. The roots of Hubam clover may exceed 6 feet in length. Sown broadcast this variety yields over 4 tons of dry matter per acre, which, if plowed under, is equal to nearly 80 tons of farm manure. It is said to save a year in crop rotation.—J. H. Lovell.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

CHARLES A. WEATHERBY, *Assistant Editor*

(See also in this issue Entries 3669, 3707, 3807, 3808, 3813, 3949, 3965, 3970, 4045, 4051, 4056, 4098, 4184, 4231, 4373, 4494, 4619, 4627, 4647)

3726. ANONYMOUS. Agricultural research at Aberystwyth. Nature 109: 795-796. 1922.—The new buildings of the Welsh plant-breeding station of the Agricultural Department, University College of Wales, were formally opened May 20, 1922. In addition to a capital grant and annual grants-in-aid it receives an endowment from Sir Laurence Phillips of £10,000 and an annual donation of £1,000 for 10 years. The grounds include 142 acres pasture and arable land, 28 acres woodland, and 5 of garden. Work will be directed to clovers, grasses, and oats, not to barley, potatoes, or rootcrops.—O. A. Stevens.

3727. ANONYMOUS. List of serials currently received in the Library of the U. S. Department of Agriculture, exclusive of U. S. Government publications and publications of the State agricultural colleges and experiment stations, arranged by title, by subject, and by region. U. S. Dept. Agric. Dept. Circ. 187. 358 p. 1922.—The list of periodicals was prepared by MARGARET T. OLCOTT, and the list of other serials by EMMA B. HAWKS.—J. R. Schramm.

3728. BALTZ. "Quoddam forestum . . . positum in magetheida." Zeitschr. Forst- u. Jagdw. 53: 564-573. 1921.—Probable meaning and modern equivalents of old Latin terms, such as forestum, forestes, nemus, magetheida, etc., are discussed.—Two groves of distorted forest trees are described on the Island of Sylt, off the coast of Friesland, the remnants of an extensive forest in ancient times, which was gradually exterminated by exposure to the powerful winds from the North Sea. North of Kampen the sand dunes are covered with an extensive plantation of *Pinus montana* and *P. uncinata* which is serving its purpose of holding the sand. The plantation is several decades old, but the trees barely appear above the dunes. The stems are prostrate and buried, the erect branches appearing as individual trees.—J. Roesser.

3729. BASSERMANN-JORDAN, F. VON. Die Geschichte des Weinbaus. [The history of grape cultivation.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 51: 36. 1921.—An abstract is given of a lecture on the history of grape cultivation in Europe. Although prehistoric remains of grape vines have been found, the opinion is expressed that the cultivation of the grape for wine may have been introduced from Asia. In any case it had become established

in France prior to the Roman occupation. Grape cultivation in Europe reached its highest development in the 15th century.—*A. W. Evans.*

3730. BENNETT, F. [Rev. of: SARGEANT, JOHN. *The trees, shrubs, and plants of Virgil.* 149 p. B. H. Blackwell: Oxford, 1920 (see Bot. Absts. 9, Entry 1080).] Rept. Bot. Soc. and Exchange Club British Isles 6: 82-84. 1920 [1921].—[See also Bot. Absts. 11, Entry 2249.]

3731. BORZA, AL. *Bibliographia botanica Romaniaae.* [Botanical bibliography of Rumania.] Bul. Inform. Grăd. Bot. Muz. Bot. Univ. Cluj 1: 41-54, 87-91. 1921; 2: 62-64, 89-92. 1922.—This collection of all the botanical literature on Rumania, both domestic and foreign, published since 1914, includes both scientific and popular literature, and foreign publications which deal with the Rumanian flora.—*M. Tiesenhausen.*

3732. BOSCH, IMAN. G. J. VAN DEN. *In memoriam Salomon Koenen.* Cultura 35: 33-35. 1 pl. 1923.—S. Koenen, one of the principal agriculturists in the Netherlands, died Dec. 26, 1922. He studied in Wageningen, Netherlands, and afterward at the University of Jena. In 1906 he became professor at the College of Agriculture, Wageningen.—*J. C. Th. Uphof.*

3733. BOUGAULT, J. *Emile Bourquelot, 1851-1921.* Bull. Trimest. Soc. Mycol. France 38: 59-68. *Portrait.* 1922.—A short account is given of the life and works of the famous pharmacologist and student of the chemistry of the fungi. His investigations on the fungi were mostly biological and included: (1) nature of sugars, their transformation and distribution and (2) soluble hydrolyzing and oxidizing enzymes. A detailed biography is given in Jour. Pharm. et Chim., Dec. 1, 1921. A list of his mycological publications is given.—*D. S. Welch.*

3734. BOUGAULT, J. *Victor Harlay, (1872-1922).* Bull. Trimest. Soc. Mycol. France 38: 25-28. 1922.—This short biographical sketch is followed by a chronological list of 36 works.—*D. S. Welch.*

3735. BRITISH MUSEUM. *Catalogue of books, manuscripts, maps, and drawings in the British Museum (Natural History) Vol. VI, Supplement A-1.* 4 to, 512 p. With Addenda and Corrigenda Vols. I and II. A-Hooker. 48 p. Oxford University Press American Branch: New York, 1922. \$22.00.

3736. BROCKMAN-JEROSCH, [H.] *Die erste Nahrung des Menschen Geschlechts.* [The first food of the human race.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 50: 166. 1920.—A short discussion is given of the foods, especially vegetable, of the primitive Europeans. Most of the plants now cultivated are of recent introduction and the primitive races derived their vegetable food almost exclusively from wild indigenous plants. The most important of these was the oak, the acorn-meal of which is still used as food in the Mediterranean region and by the Indians.—*A. W. Evans.*

3737. BURNAT, EMILE. *Autobiographie publié avec une étude sur le botaniste et son oeuvre, des souvenirs et documents diverses par John Briquet . . . et François Cavillier.* [Autobiography published with a study of the botanist and his work, reminiscences and various documents by John Briquet and François Cavillier.] 185 p. Conservatoire botanique: Geneva, 1922.—Burnat was born at Vevey, Oct. 21, 1828. He was educated at Geneva and Paris as an engineer and engaged in industrial work at Mulhouse (Mulhausen), Alsace, 1851-1870. He then retired and settled at Nant, devoting himself to the study of the flora of the Maritime Alps until his death in 1920. August Gremli, J.-J. Vetter, M. A. Tonduz, L. Favrat, Emile Samuel Abrezol, Louise Jordan, François Cavillier, and John Briquet were associated with him in this enterprise. Some biographical information is given on each of the above. His herbarium was given to the city of Geneva.—The autobiography is followed by further biographical

data and reminiscences by JOHN BRIQUET and FRANÇOIS CAVILLIER. A bibliography of 184 titles of Burnat's publications, lists of species named in his honor, of collecting trips, of visitors and correspondents, a summary of collections in his herbarium, are followed by reprints of 3 of his speeches. Eulogies by P. BORNAUD, E. WILCZEK, C. DE LACROIX, KOPP, DANIEL MIEG, and a list of biographical notices, are appended.—*C. W. Dodge.*

3738. CARRIER, LYMAN. *The beginnings of agriculture in America.* xvii + 323 p., 30 fig. McGraw Hill Book Co. Inc.: New York & London, 1923.—The work touches briefly the theory of evolution, effect of environment on species, determination of plant history, origin of food plants, similarity of plants in the old and new worlds, primitive agriculture, plant culture as a start toward civilization, domestication of animals, early civilization in dry climates, accumulation of wealth and related topics. A chapter each is devoted to old world agriculture, American Indians, natural vegetation in America, Indian agriculture and a full discussion of Indian crops, Indian products and practices. The history of the exploration period and English Colonial settlements is told in detail, followed by the Pilgrim period and the story of the settlement of New York and New Jersey under the Dutch West India Co. Separate chapters give the history of Maryland, Delaware and Pennsylvania, Connecticut and Rhode Island, North and South Carolina and Georgia. French settlements and influence, colonial expansion, introduction of European crops, introduction of domestic animals, farm implements and the use of fertilizers, slavery, the effect of colonial commerce on agriculture, and the influence of the manufacture of alcoholic beverages on colonial agriculture. The closing chapter tells the history of relations with Great Britain. A valuable bibliography is appended.—*Mary R. Burr.*

3739. [DRUCE, G. C.] [Frederick Arnold Lees.] Rept. Bot. Soc. and Exchange Club British Isles 6: 358-361. 1921 [1922].

3740. DRUCE, G. C. *Obituaries.* Rept. Bot. Soc. and Exchange Club British Isles 6: 93-108. 1920 [1921].—Notices are included of John Gilbert Baker, 1834-1920; A. Montgomerie Bell, 1845-1920; Reginald Farrer, 1880-1920; and Wm. Moyle Rogers, 1835-1920.—*G. C. Druce.*

3741. DRUCE, G. C. [Thomas Carew Hunt and his herbarium.] Rept. Bot. Soc. and Exchange Club British Isles 6: 454-456. 1921 [1922].

3742. [DRUCE, G. C.] [William Whitwell.] Rept. Bot. Soc. and Exchange Club British Isles 6: 367-369. 1921 [1922].

3743. EAST, E. M. *Mendel and his contemporaries.* Sci. Monthly 16: 225-237. 1923.—Mendel developed a method, but the biologists of his day were not ready for such a change. When Weissmann's theory needed testing, Mendel's long-forgotten paper was brought to light, furnishing the necessary method, and genetics entered upon a new era.—*L. Pace.*

3744. EBERLE, E. G. *Frederick Belding Power.* Jour. Amer. Pharm. Assoc. 11: 403-405. *Portrait.* 1922.—In 1914 Frederick Belding Power resigned as Director of the Chemical Research Laboratories of the Burroughs Wellcome Co., London, to accept a position in the Phytochemical Laboratory, Bureau of Chemistry, Washington, D. C.—*Anton Høgstad, Jr.*

3745. FAIRCHILD, DAVID. *Alexander Graham Bell.* Jour. Heredity 13: 195-200. 1 fig. 1922.—This account of the life of Dr. Bell describes especially his studies in genetics and eugenics. He spent many years in developing a strain of twin-bearing, multiple-nippled sheep, and his efforts had been only partly successful at the time of his death. His principal eugenic studies related to the inheritance of deafness, and to the inheritance of longevity in the Hyde family.—*R. C. Cook.*

3746. FITTING, HANS. **Herman Vöchting.** Ber. Deutsch Bot. Ges. 37: (41)–(77). Pl. 1. 1919.—This article gives an extensive sketch of the life and work, together with a portrait and bibliography, of this German botanist (1847–1917).—*W. C. Muenscher.*

3747. FUNK, GEORG. **Zur Geschichte botanischer Forschung an der zoologischen Station zu Neapel 1872–1922.** [History of botanical research at the Zoological station at Naples, 1872–1922.] Ber. Deutsch. Bot. Ges. 40: 221–241. 1922.—This paper gives an extensive sketch of the history of the zoological station at Naples, especially of the botanical research work done there. The station was founded by Anton Dohrn in 1872. The author discusses the development of the laboratories, herbarium, equipment, etc. During the last 50 years botanists have worked at Naples upon general botanical problems as well as on marine algae. A bibliography of botanical work from this station is given.—*W. C. Muenscher.*

3748. GUFFROY, CH. **Léon Roussel.** Bull. Trimest. Soc. Mycol. France 38: 69–70. 1922.—This agricultural engineer, a student of the fungi, died March 11, 1916, from wounds received at Verdun. He was cited for exceptional bravery and received the Cross of the Legion of Honor. He was chiefly interested in agriculture and his work as director of an agricultural society took him to Spain in 1904. He published several popular works on edible and poisonous fungi.—*D. S. Welch.*

3749. HABERLANDT, G. **Zur Geschichte der physiologischen Pflanzenanatomie.** [History of physiological plant anatomy.] Ber. Deutsch. Bot. Ges. 40: 156–160. 1922.—This criticism was prompted by remarks appearing in the historical introduction to *Zelle und Cytoplasma* by H. Lundegarth, appearing in the first part of K. Linsbauer's *Handbuch der Pflanzenanatomie* in which Sachs, Schwendener, and Haberlandt are referred to as the founders of physiological plant anatomy. The author points out that physiological plant anatomy is as old as plant anatomy itself. In the 17th century Malpighi and Grew and their followers endeavored to explain, upon a functional basis, the anatomical structures which they discovered. During the first half of the 19th century Mohl, Unger, Schleiden and Nägeli were interested primarily in pure descriptive anatomy. Sachs also belonged to this school. In his earlier works Sachs did not mention function in his definition of tissues. The appearance in 1874 of Schwendener's *Das Mechanische Prinzip im Anatomischen Bau der Monokotylen*, is regarded as the rebirth of physiological plant anatomy. Lundegarth fails to mention or cite this work. After the appearance of this work, in 1877, Haberlandt went to Tübingen to study with Schwendener. Only after the appearance of Haberlandt's contributions of 1879 and 1881 did Sachs modify his views of tissues. A study of the literature cited does not justify placing the name of Sachs among the founders of physiological plant anatomy.—*W. C. Muenscher.*

3750. HARRIS, J. ARTHUR. **Galton and Mendel: their contribution to genetics and their influence on biology.** Sci. Monthly 16: 247–268. 1923.

3751. HASKELL, R. J. **The fourth annual summer field meeting of the American Phytopathological Society.** Phytopathology 13: 150–152. 1923.—A report is given of the meeting held Aug. 29 to Sep. 1, 1922, in the trucking districts of Delaware, New Jersey, and Pennsylvania.—*B. B. Higgins.*

3752. HENRY, A. **The Dublin Arboricultural Society.** Gardeners' Chron. 70: 196. 1921.—This society, probably founded in 1830, is the oldest society of its kind in the British Isles. It published its only volume, *Transactions Arboricultural Society*, in 1831. No further reference to the society has been found.—*C. W. Dodge.*

3753. HILL, T. G. **Index to the Annals of Botany.** Vols. XXI–XXX. (1907–1916). 8vo, 40 p. American Branch Oxford University Press: New York. 1922.

3754. HUSNOT, T. **Fernand Camus**. Rev. Bryologique 49: 67, 68. 1922.—Camus was born at Chodat, France, in 1852 and was educated as a physician, obtaining his degree in 1880. Soon afterwards, however, he became associated with the division of cryptogamic botany in the Natural History Museum at Paris and retained his position there until his death [in 1922]. He was particularly interested in the bryophytes and published numerous papers dealing with the mosses and hepatics of France.—A. W. Evans.

3755. [HUSNOT, T.] **George-Alfred Holt 1852-1921**. Rev. Bryologique 49: 16. 1922.—Holt was born at Douglas on the Isle of Man, England, and died at Sale, Cheshire. Although a chemist by profession he was a diligent student of bryology and discovered many rare species of mosses and hepatics in various parts of the British Isles.—A. W. Evans.

3756. J[ACKSON], B. D. **Early British botanists**. [Rev. of: GUNTHER, R. T. **Early British botanists and their gardens**, based on unpublished writings of Goodyer, Tradescant and others. viii + 417 p. University Press: Oxford, 1922.] Nature 109: 806-807. 1922.

3757. KAEMPFERT, WALDEMAR. **An Indian master-mind in science**. Asia 23: 173-176, 219. 4 fig. 1923.—A popular presentation of the work of J. C. Bose is given.—C. W. Dodge.

3758. KEARNEY, THOMAS H. **Louis Trabut, botanist and plant breeder**. Jour. Heredity 13: 153-160. 5 fig. 1922.—The author summarizes the work of Dr. Trabut, Government Botanist of Algeria, in plant introduction and plant breeding, with especial reference to his cooperation with U. S. Department of Agriculture in introducing numerous valuable plants of French North Africa into the U. S. A.—T. H. Kearney.

3759. KNIEP, HANS. **Ernst Stahl**. Ber. Deutsch. Bot. Ges. 37: (85)-(104). Pl. 1. 1919.—An extensive sketch is given of the life and work of this German botanist (1848-1919). A portrait and bibliography are included.—W. C. Muenscher.

3760. KNOBLAUCH, A. **Verzeichnis der Stifter**. [List of the founders.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 48: 35-64. 1918.—The present compilation gives biographical notices of the 32 founders of the Senckenberg natural history society of Frankfort on the Main. Of these the following 5 were interested in botany: Johannes Becker, Georg Wilhelm Freireiss, Louis Daniel Jassoy, Johann Friedrich Metzler, and Johann Kaspar Stein. Becker was born at Speyer in 1769 and died at Frankfort in 1833; he was a student of the local flora and played an active part in the establishment of the botanical garden and museum. Freireiss was born at Frankfort in 1789 and died at Leopoldina, Brazil, in 1825; in 1824 he published a description of that country in which he included an account of the vegetation. Jassoy was born at Hanau in 1768 and died at Frankfort in 1831; he established a botanical garden that won the warm admiration of Goethe. Metzler was born at Frankfort in 1749 and died at Offenbach in 1825; his garden, also, attracted the attention of Goethe. Stein was born at Gemmingen in Würtemberg in 1776 and died at Frankfort in 1834; he made a rich collection of plants in the vicinity of the city and incorporated it in the herbarium of the museum.—A. W. Evans.

3761. LARSEN, TH., og CARL MARIBOE. **Oversigt over fremmed Litteratur**. [Review of foreign literature.] Tidsskr. Planteavl 28: 615-642. 1922.—This is a systematic list of references to recent European and American literature on agricultural subjects with a section devoted to garden literature.—Albert A. Hansen.

3762. LEHMAN, FRANZ. **Alfred Koch**. Jour. Landw. 70: 217-220. 1922.—An obituary.—F. M. Schertz.

3763. LEIJIS, J. J. **Kolonisatie van Suriname door Nederlandsche Landbouwers**. [Colonization of Surinam by Dutch agriculturists.] West Indië 4: 47. 1919.—A history of the custom

methods of working, and present condition of colonization by Dutch agriculturists in Surinam is given.—*J. C. Th. Uphof.*

3764. LINNÉ, CARL VON. *Bref och skrivelser af och till Carl von Linne med understöd af Svenska Staten utgifna af Uppsala Universitet. Forsta afdelningen, Del 8: Bref till och fran Svenska Enskilda personer Kalm—Laxman. Utgifna och med upplysande noter forsedds af J. M. HULTH.* [Letters and correspondence of and to Carl von Linné published by the University of Uppsala with a grant from the Swedish state. 1st section, part 8: Letters to and from private persons in Sweden, Kalm and Laxman, edited with instructive historical notes by J. M. HULTH.] *v + 200 p.* A. B. Akademiska Bokhandeln: Uppsala, 1922. *6 kronor.*—This part contains a large amount of correspondence of Pehr Kalm (1716–1779) and also that of Johan Olof Kalmeter (1746–1776), Georg von Kjöörning (1743–1792), Johan Mauritz Klinckowström (1692–1768), Mårten Kähler (1728–1773), Magnus Lagerström (1691–1759), and Erik Laxman (1737–1796).—*C. W. Dodge.*

3765. MACOUN, JOHN. *Autobiography of John Macoun, M. A. [1831–1920.] Canadian explorer and naturalist, assistant director and naturalist to the Geological Survey of Canada. x + 305 p., 3 portraits, 5 pl.* Field-Naturalists' Club: Ottawa, 1922.—This memorial volume contains a brief introduction by ERNEST THOMPSON SETON. Macoun was born Apr. 17, 1831, in Maralin, County Down, Ireland. He emigrated with his family to Ontario, Canada, in 1850 where he worked as a farm hand and school teacher. After a brief normal training in Toronto he became professor of natural history at Albert College and in 1879 joined the staff of the Geological Survey of Canada. He spent many years on exploring parties in connection with the first Canadian transcontinental railway lines and later visited other parts of Canada. His autobiography ends abruptly in 1904 and the final chapter, written by his son, W. T. MACOUN, describes very briefly his declining years, which he spent in Sidney, British Columbia, where he died July 18, 1920. There follows a list of species named in his honor. The work is filled with interesting incidents of his botanical explorations but contains no index.—*C. W. Dodge.*

3766. MATISSE, G. *Le mouvement scientifique contemporain en France. 1. Les sciences naturelles.* [The contemporary scientific movement in France. 1. Natural sciences.] (Collection Payot 10.) *160 p.* Payot & Cie.: Paris, 1921. *4 francs.*—After a detailed discussion of the foundation of marine laboratories of experimental zoology, the development of animal embryology, and theories of the adaptation of the organism to its environment, the author briefly sketches the work of Gustave Chauveaud on the embryogeny of plants, of Marin Moliard on plant physiology, and of L. Matruchot on the cultivation of fungi.—*C. W. Dodge.*

3767. MÖBIUS, M. *Die Frankfurter Floristen. Zur Erinnerung an Martin Dürer.* [The floristic botanists of Frankfort. In commemoration of Martin Dürer.] *Ber. Senckenberg. Naturf. Ges. Frankfurt a. M.* 51: 154–166. 1921.—The author gives short biographical notices of numerous botanists, as a result of whose activities several local floras of Frankfort have been written, some of which are still in manuscript. The oldest to be published was the *Flora Moeno-Francofurtana* of J. J. Reichard, the 2 parts of which appeared in 1772 and 1778. Another important local flora was published in 1828 by J. Becker [see Bot. Absts. 12, Entry 3760] and bears the title, *Flora der Gegend um Frankfurt a. M.* A 3rd, by G. Fresenius, dated 1832, was the *Taschenbuch zum Gebrauch auf Botanischen Excursionen in der Umgegend von Frankfurt a. M.* These published floras, as well as those still unpublished, are fully described, and a list of more general works dealing incidentally with the region about Frankfort is appended. Martin Dürer, in whose commemoration the paper was prepared, was, in the opinion of the author, the botanist best fitted to prepare a new local flora, but unfortunately he failed to bring a work of this character to completion. He was born at Frankfort in 1842 and died there in 1921. Although an apothecary by profession he was greatly interested in plants and, after his retirement in 1879, devoted himself almost wholly to his botanical studies.—*A. W. Evans.*

3768. MOLLIARD, M. Discours prononcé aux obsèques de M. Gaston Bonnier. [Discourse presented at the funeral of M. Gaston Bonnier.] Rev. Gen. Bot. 35: 1-5. 1923.—The life of M. Gaston Bonnier is reviewed and tribute paid to his work and personality.—*J. C. Gilman.*

3769. M[U]R[E]T, E. Le centenaire d'Elias Landolt. [Centenary of Elias Landolt.] Jour. Forest. Suisse 72: 221-223. 1 pl. 1921.—The article is a résumé of the life work of Elias Landolt, the father of Swiss forestry, the creator of a Swiss practice of silviculture, the initiator of federal forest legislation, the teacher in forestry for 38 years under whom all Swiss foresters were trained.—*G. Kempff.*

3770. PABISCH, H. O. Tunmann. Ber. Deutsch. Bot. Ges. 37: (77)-(84). 1919.—A brief sketch of the life and work of this Austrian pharmacologist (1867-1919) is given together with a bibliography.—*W. C. Muenscher.*

3771. POPENOE, PAUL. Dr. Fenzi's contributions to American horticulture. Jour. Heredity 13: 215-220. 2 fig. 1922.—An account is presented of the life and work of E. O. Fenzi, born in Florence, Italy, 1843, who was awarded the third Meyer medal for distinguished service in plant introduction. He moved to California in 1893. Among the foreign plants brought by him to the U. S. A. are: *Lippia repens*, *Feijoa sellowiana*, *Vitis capensis*, *Buddleia madagascariensis*, *Lyonothamnus floribundus* var. *asplenifolius*, *Taxodium mucronatum*, *Asparagus scandens* var. *deflexus*, and *Acacia podalyriaefolia*. In 1913 he returned to Italy and has since been active in plant introduction work in Libya, Italy's North African colony.—*R. C. Cook.*

3772. PORTERFIELD, W. M., JR. References to the algae in the Chinese classics. Bull. Torrey Bot. Club 49: 297-300. Fig. 1. 1922.—The Chinese character for Algae is Tsao, which appeared in very early times. Judging from the references in ancient Chinese literature and from an "analysis of the ideograph, there is a possibility, if not a probability, that the knowledge of the algae as a distinct morphological unit in the plant kingdom dates back to very early times."—*P. A. Munz.*

3773. PRAIN, DAVID. Robert Allen Rolfe. Rept. Bot. Soc. and Exchange Club British Isles 6: 365-367. 1921 [1922].

3774. R., A. B. [William Carruthers.] Nature 109: 787-788. 1922.—William Carruthers was born in 1830 at Moffat, Dumfries, and died June 2, 1922. He was educated for the ministry at Edinburgh. Appointed in 1859 as assistant to J. J. Bennett, who recently had succeeded Robert Brown as Keeper of the Department of Botany at the British Museum, Carruthers succeeded Bennett in 1871 and his work there until 1894 showed great development [see Journal of Botany, 1895]. He was prominent in the Linnean, Royal, and other scientific societies. As consulting botanist to the Royal Agricultural Society from 1871 to 1910 he made many contributions to diseases of crops, pasture grasses, and to seed testing. His chief contributions to pure science were in paleobotany, notably his monograph on fossil Cycadean stems of the Secondary Rocks of Britain [Trans. Linn. Soc. 1870].—*O. A. Stevens.*

3775. REA, CARLETON. William Beriah Allen, (1875-1922). Trans. British Mycol. Soc. 8: 191-192. 1923.—William Beriah Allen of Benthall, Shropshire, was a potter by profession but he became at the same time an eminent mycologist and made several interesting discoveries and numerous additions to the British fungus flora.—*W. B. McDougall.*

3776. RÖMER, IULIUS. Schimbul meu de scrisori cu Florian Porcius. [My correspondence with Florian Porcius.] Bul. Inform. Grăd. Bot. Muz. Bot. Univ. Cluj 1: 57-63. 1921.—These reminiscences of the Transylvanian botanist give notes on interesting plants of Rumania.—*Al. Borza.*

3777. ROPER, IDA M. [Cedric Bucknall.] Rept. Bot. Soc. and Exchange Club British Isles 6: 355-356. 1921 [1922].

3778. SAVAGE, S. *A little known Bohemian herbal*. Library 2: 116-131. 4 fig., 2 portraits 1921.—The Bohemian edition of P. A. Mattioli, translated by Tradeáš Hájek z Hajku and printed at Prag in 1562 by Georgius Melantrichus ab Aventino, is the first in which the large woodcuts of the later editions were used. The collation and notes on the translator and printer are followed by a discussion of signatures of the engravers, which were effaced before the blocks were used for the German and Venice editions. Six of the woodcuts, 3 being of plants, are reproduced. The blocks were used repeatedly to illustrate herbals, being found in Duhamel du Monceau, *Traité des Arbres et Arbustes qui se Cultivent en France en Pleine Terre*, where it is stated that the original blocks were used.—C. W. Dodge.

3779. SCHONLAND, S. *South African botanical literature*. Bot. Surv. South Africa Mem. 4. 69-85. 1922.—This includes an enumeration of the principal works on systematic botany, economic botany, plant pathology, South African phytogeography, ecology of South African plants, and fossil plants.—E. M. Doidge.

3780. SHULL, GEORGE H. *A permanent memorial to Galton and Mendel*. Sci. Monthly 16: 263-268. 1923.—The plan proposes to use the income from a permanent fund to illustrate such research papers in Genetics as need colored plates.—L. Pace.

3781. SMITH, ERWIN F. *Pasteur, the man* (Dec. 27, 1822-Sept. 28, 1895). Sci. Monthly 16: 269-279. 1923.—Such facts of his ancestry and youth as present his characteristics and his broad field of work are given in this appreciation of Pasteur.—L. Pace.

3782. SMITH, W. G. *Botany in the twentieth century*. Pharm. Jour. 107: 473-476. 1922.—The address includes the following headings: Beginnings of plant chemistry and physiology; life in the soil; bacteroids; nitrification mycorrhiza; the relation of the plant to the soil; the plant-cell; metabolism; plant-breeding; selection and hybridization; diseases in plants; the treatment of plant diseases; immune varieties; recent botanical progress.—E. N. Gathercoal.

3783. STRAND, E. [Rev. of: BRYK, F. *Linnaeus im Auslande*. (Linnaeus abroad.) 33 p., 3 pl. Stockholm, 1921.] Arch. Naturgesch. Abt. 88: 167, 168. 1922.

3784. TUBEUF. [Rev. of: MORSTATT, H. *Bibliographie der Pflanzenschutzliteratur für 1914-1919*. (Bibliography of plant protection literature.) viii + 463 p. Biologische Reichsanstalt für Land- u. Forstwiss.: Berlin-Dahlem, 1921 (see Bot. Absts. 11, Entry 4543).] Forstwiss. Centralbl. 45: 38. 1923.—Four points are suggested for making such bibliographies more useful to German scientists: (1) the literature should be more carefully selected, and unimportant material omitted; (2) the important foreign literature should be covered by good abstracts; (3) for the easily accessible German material only the general scope should be noted and (4) the libraries in which the literature may be consulted should be indicated.—W. N. Sparhawk.

3785. TUCKER, ETHELYN M. *Incunabula in the library of the Arnold Arboretum*. Jour. Arnold Arboretum 4: 56-60. 1923.—The incunabula of the Arnold Arboretum library numbering 17, are briefly described; some of the works are very rare and no other copies are known in this country.—Alfred Rehder.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 3730, 3738, 3747, 3749, 3750, 3781, 3782, 3969, 4041, 4411, 4415, 4453, 4454, 4455, 4619, 4715)

3786. BONNIER, G., et LECLERC DU SABLON. *Cours de botanique*. [Textbook of botany.] Fasc. IV (2nd part) and Fasc. V (1st and 2nd part). 8vo, 527 p., 1210 fig. Librairie générale de l'Enseignement: Paris [no date].

3787. BURLINGAME, L. L., H. HEATH, E. MARTIN, and G. L. PEIRCE. *General biology*. xix + 569 p. H. Holt & Co.: New York. 1923.

3788. CLUTE, WILLARD N. *Botany for beginners*—V. *Amer. Bot.* 29: 7-11. 1923.

3789. CLUTE, WILLARD N. *Plant names and their meanings*—XIV. *Scrophulariaceae*. *Amer. Bot.* 29: 18-23. 1923.

3790. DRUCE, G. C. [Rev. of: BEVIS, J. F., and H. J. JEFFERY. *British plants; their biology and ecology*. 2nd ed., vi + 346 p. Methuen & Co.: London, 1920.] *Rept. Bot. Soc. and Exchange Club British Isles* 6: 59-61. 1920 [1921].—[See also *Bot. Absts.* 9, Entries 672, 676; 11, Entry 1103.]

3791. DRUCE, G. C. [Rev. of: SMALL, JAMES. *Text-book for medical and pharmaceutical students*. 681 p., 1350 fig. J. A. Churchill: London, 1921.] *Rept. Bot. Soc. and Exchange Club British Isles* 6: 351-352. 1921 [1922].—[See also *Bot. Absts.* 10, Entry 1602; 11, Entry 111.]

3792. FOSTER, ROY L. *Fact and fiction about evolution*. 3 + 74 p. The Stratford Co.: Boston, 1923.

3793. [GILTNER, WARD.] *Laboratory manual in general microbiology*. 2nd ed., xxi + 472 p., 79 illus. John Wiley & Sons, Inc.: New York, 1921.—This manual has been "prepared by the Laboratory of Bacteriology and Hygiene, Michigan Agricultural College." In this edition the use of Fuller's scale has been abandoned, the sections dealing with soil and water and sewage bacteriology have been largely rewritten, and alterations and additions have been made to the section on pathogenic bacteriology and notably to the Appendix. Part I, General morphological and cultural methods; Part II, Physiology of microorganisms; Part III, Applied microbiology, including (1) microbiology of air, water and sewage, soils, dairy practice, plants, (2) animal diseases and immunity; (3) appendix.—C. S. Gager.

3794. GILTAY, E. *Pflanzenphysiologische demonstrationen*. [Plant physiological demonstrations.] *Mededeel. Landbouwhoogeschool Wageningen* 22: 1-14. 3 pl., 3 fig. 1922.—Laboratory methods are presented on (1) the function of the seedcoat; (2) demonstrating before large audiences the weight of curving root tips; (3) closing of stoma during killing of the guard cells; (4) absorption spectrum of chlorophyll; (5) plasma movements of *Tradescantia*.—J. C. Th. Uphof.

3795. GISEVIUS, P. *Illustriertes landwirtschafts-Lexikon*. [Illustrated agricultural lexicon.] 5th ed. With the collaboration of ELIZABETH BÖHM, W. BORGMANN, and others. 2 vol. *Illus.* P. Parey: Berlin, 1920.

3796. INTERNATIONAL CORRESPONDENCE SCHOOLS, [SCRANTON, PENNSYLVANIA.] *The farm and garden handbook*. For all persons interested in general farming, fruit culture,

truck farming, market gardening, live stock production, bee keeping, dairying, etc. xviii + 429 p., *illus.* International Textbook Co.: Scranton, Pennsylvania, 1922.

3797. JORDAN, E. O. A text-book of general bacteriology. 7th ed., 744 p. W. B. Saunders Co., Ltd.: Philadelphia and London, 1922.—In this edition the chapters on influenza, anaerobes, and methods of studying bacteria have been entirely rewritten, and the chapters on Streptococci, Pneumococci, and typhus fever extensively revised. Important additions have been made among others, to the sections on immunity and yellow fever.—C. S. Gager.

3798. KARRAKER, P. E. Report on the progress in standardizing the elementary college course in soils. Jour. Amer. Soc. Agron. 15: 25-28. 1923.

3799. KERN, O. J. Outlines of course of instruction in agricultural nature study for the rural schools of California. California Agric. Exp. Sta. [Unnumbered Bull.] 106 p. 1923.—Suggestive material for the use of teachers in the elementary schools in California is presented. The material is grouped under 4 general topics: Human needs, interests and activities; plant life throughout the year; animal life throughout the year; natural phenomena and the inorganic world and soil studies.—A. R. C. Haas.

3800. MAHIN, EDWARD G., and RALPH H. CARR. Quantitative agricultural analysis. xiii + 329 p., 62 fig. McGraw-Hill Book Co., Inc.: New York. 1923.—International Chemical Series.—The book is prepared with the conviction of the authors that "one of the things most needed by scientific agriculture today is an increasing body of agricultural chemists who understand the importance of desiring to know *why* matters are thus and so," and that "the scientific development of fundamentals" must be included with instruction in "the mechanical notions and processes of chemistry." Part I, general analysis, includes: theory and general principles, general operations, quantitative determinations. Part II, special measurements, includes: density and specific gravity, heat of combustion (calorimetry), index of refraction, optical rotation (polarimetry), hydrogen-ion concentration. Part III, analysis of agricultural materials, includes: feeds, saponifiable oils, fats and waxes, dairy products, soils, fertilizers insecticides and fungicides, table of logarithms and antilogarithms, table of atomic weights.—C. S. Gager.

3801. MATHEWS, F. SCHUYLER. The book of wild flowers for young people. xvi + 397 p., *illus.* G. P. Putnam's Sons: New York and London, 1923.

3802. MOON, TRUMAN JESSE. Laboratory manual, biology for beginners. 191 p., 23 pl. H. Holt and Co.: New York, 1922.

3803. MUKERJI, N. G. Handbook of Indian agriculture. 4th ed., 622 p. Thacker, Spink & Co.: Calcutta; W. Thacker & Co.: London, 1923.

3804. ORTICONI, A., et R. CLOGNE. Pratique bactériologique. [Bacteriological practice.] 489 p., 2 pl. (col.), 110 fig. Le Francois: Paris, [n. d.]

3805. PACE, LULA. A few Texas plants. Baylor Univ. Bull. 25⁵⁻⁶: 1-60. Fig. 1-83. 1923.—This is a popular presentation of some of the commonest plants, for teachers in nature study courses and for boys and girls of the grades.—L. Pace.

3806. PARKS, H. B. What's in a name? Amer. Bee Jour. 62: 323-324. 1922.—The origin of common names of plants is briefly discussed.—J. H. Lovell.

3807. REED, G. M. Louis Pasteur. Brooklyn Bot. Gard. Leaflets 11³⁻⁴. 8p. 1923.—This is a brief popular account of Pasteur's life and work, issued in connection with the Pasteur-Mendel program at the Brooklyn Botanic Garden, April 19, 1923.—A. H. Graves.

3808. REPPERT, R. R. *Cartoons in agricultural teaching.* [Abstract.] *Phytopathology* 13: 33. 1923.

3809. TANSLEY, A. G. *Elements of plant biology.* 15 + 410 p., 63 fig. G. Allen and Unwin: London; Dodd, Mead and Co.: New York, 1922.—This book is intended for medical students and others who may not continue the study of botany, but who desire or are obliged to obtain some elementary knowledge of plants, particularly in relation to general biology. After an introductory chapter on plants and animals, chapters 2-8 deal with organic substances, protoplasm and the cell; chapters 9-11 with bacteria and fungi. Chapters follow on the origin of sex and of the soma, the differentiation of tissues, life histories of bryophytes, pteridophytes and seed plants. The last chapters are devoted to the tissues and vegetative and reproductive organs of the seed plants.—A. H. Graves.

3810. TRAFTON, GILBERT H. *Biology of home and community: a textbook for high schools.* x + 614 p., illus. Macmillan Co.: New York, 1923.

3811. TRUE, A. C. *Education and research in agriculture and home economics in the United States.* Supplementing exhibit of the States Relations Service, U. S. Department of Agriculture at the Brazil centennial exposition, Rio de Janeiro, Brazil, 1922-1923. 45 p. illus. Government Printing Office: Washington, 1922.

3812. VILJOEN, W. J. [Chairman]. *Report of the committee on agricultural education.* 54 p. Cape Times Ltd., Government Printers: Cape Town, South Africa, 1922.

3813. WHITE, ORLAND E. *Gregor Mendel, pioneer investigator of the laws of heredity.* Brooklyn Bot. Gard. Leaflets 11¹. 4 p. 1923.—This is a brief popular account of Mendel's life and work, issued in connection with the Pasteur-Mendel program at the Brooklyn Botanic Garden, April 19, 1923.—A. H. Graves.

CYTOLOGY

GILBERT M. SMITH, *Editor*

(See in this issue Entries 3793, 4023, 4151, 4152, 4183, 4220, 4221, 4232, 4260, 4525, 4574)

ECOLOGY AND PLANT GEOGRAPHY

FORREST SHREVE, *Acting Editor*

(See also in this issue Entries 3668, 3715, 3728, 3779, 3790, 3901, 3924, 3978, 4119, 4142, 4150, 4162, 4172, 4216, 4222, 4229, 4466, 4469, 4552, 4558, 4559, 4560, 4561, 4562, 4563, 4571, 4575, 4585, 4587, 4618, 4619, 4630, 4681)

GENERAL, FACTORS, MEASUREMENTS

3814. ALLEN, W. E. *Studies on catches of marine phytoplankton made by aid of the Kofoid bucket in 1921.* *Ecology* 4: 74-80. 1923.—A general report is presented on work done by members of the staff of Scripps Institution. The studies, confined to diatoms and dinoflagellates (the diatoms being the most numerous) indicate a lack of knowledge of the relative fertility of different levels of the ocean depths. The same may be said with reference to the influence of temperature and other environmental factors. Maximum diatom production occurs near the summer solstice because of increase in light and temperature. The Kofoid bucket was found to be practical and accurate. It is believed that plans and methods have been found that are dependable and may be used in a permanent program of operations. T. J. Fitzpatrick.

3815. CANZ, E. Die Bedeutung des Wassers für das Pflanzenwachstum. [The significance of water for plant growth.] Jahresh. Ver. Vaterländ. Naturk. Württemberg 77: xxii-xxiii. 1921.—This report of a lecture emphasizes the importance of a liberal water supply for cultivated crops. The diversity of soils with respect to available water is mentioned, and that the amount necessary for vigorous plant development must exceed the wilting coefficient. It is shown that an increase in the harvest is dependent upon an increased water supply.—A. W. Evans.

3816. CHOUX, P. Revue des travaux de botanique tropicale et subtropicale. 1910-1919. Suite. [Review of work in tropical and subtropical botany 1910-1919. Continued.] Rev. Gén. Bot. 35: 34-41, 92-100, 141-148. 1923.

3817. ECOLOGICAL SOCIETY OF AMERICA COMMITTEE ON THE PRESERVATION OF NATURAL CONDITIONS. Preserves of natural conditions. 31 p., 15 fig. Ecological Society of America: 1921.

3818. GUILLAUME, ANDRÉ. Étude sur les limites de végétation dans le nord et l'est de la France. [On the limits of vegetation to the north and east in France.] Compt. Rend. Acad. Sci. Paris 175: 713-716. 1922.—Other authors have studied the limits of distribution of certain arbitrarily chosen species. It is preferable to choose a restricted region and study all of the plants. The area here studied is bounded southwest by Loiret, northwest by the Somme, northeast by Lorraine, and southeast by Haute-Saône. Of 1332 species found, 340 do not extend farther to the north and east. Influences which bring about these limits are discussed under climatic, geologic, physical, and palaeontological headings.—C. H. Farr.

3819. KOLKWITZ, R. Ueber die Standorte der Salzpflanzen. III. *Triglochin maritima*. [Stations for halophytes. III. *Triglochin maritima*.] Ber. Deutsch. Bot. Ges. 37: 343-347. 1919.—The author discusses the invasion and establishing of *Triglochin maritima* in certain areas in Germany recently flooded by salt water.—W. C. Muenscher.

3820. KOLKWITZ, R. Ueber die Standorte der Salzpflanzen. IV. *Erythraea linariifolia*. [Stations for halophytes. IV. *Erythraea linariifolia*.] Ber. Deutsch. Bot. Ges. 37: 420-426. 1919.—*Erythraea linariifolia*, a halophyte, is found in scattered localities in Germany in which the sodium chloride content of the water is very low. The water in these localities was found to contain large amounts of calcium sulphate.—W. C. Muenscher.

3821. LUTZ, FRANK E. Altitude in Colorado and geographical distribution. Bull. Amer. Mus. Nat. Hist. 46: 335-366. 1922.—This is a study based on plants, chiefly those listed in Rydberg's Flora of Colorado, from Portulacaceae to Fabaceae, inclusive. It applies the method of geographic average to the relations between altitudinal (in Colorado) and geographic distribution, and also derives an expression in terms of mid-latitude for Merriam's life zones in Colorado.—Frank E. Lutz.

3822. MARTELLI, ALESSANDRO. Forze naturali e fattori umani nella trasformazioni della montagna. [Natural forces and human factors in the metamorphoses of mountains.] Ann. R. Ist. Superiore Forest. Firenze 6: 3-21. 1920-1921.—This lecture was delivered at the Royal Superior National Forest Institute, Florence.—Ferdinand W. Haasis.

3823. MOREILLON, M. Évaporation de l'eau à l'air libre, à Montcherand (cant. de Vaud). [Free air evaporation of water at Montcherand (canton of Vaud).] Jour. Forest. Suisse 73: 52-56. 1922.—Observations of the free air evaporation on denuded and non-denuded soils were started by Bühler at Zürich and continued at Tübingen. A table compares the longer records obtained at Tübingen with those obtained at Montcherand, the latter having the higher free-air evaporation. A 2nd table gives values for soils denuded and covered with sod, for humus, limestone, sand and clay. Data obtained with a Wild evaporimeter and by

evaporation measurements of large bodies of water are nearly alike. A 3rd table covering the years 1911-1921, inclusive, shows the free-air evaporation measured with the Wild evaporimeter placed in the shade at Montcherand, 565 m. in altitude. During this period the Wild evaporimeter evaporated 60 per cent of the total precipitation received.—In answer to the question whether the evaporation rate is higher or lower in the mountains than on the plains, preliminary results with a Wild evaporimeter show a lower, and with a Livingston-Amberg evaporimeter a consistently higher rate for increases in altitude. Fog and mist condensations in the mountains have a negligible effect upon the evaporimeters. Slight free air evaporation takes place in temperatures below 0°C. throughout the day.—*G. Kempff.*

3824. NICHOLS, G. E. A working basis for the ecological classification of plant communities. *Ecology* 4: 11-23. 1923.—This paper is in the nature of a revision and amplification of an earlier one. Its aim is to present the essential facts and principles underlying the ecological classification of plant communities and to suggest a working plan for ecological surveys. The 1st part deals with the plant association as a vegetation-unit in its relation to the environment; the 2nd with the ecological classification of plant associations. Association is described as a group or community occupying a common habitat, the vegetation being similar throughout its extent in physiognomy, ecological structure, and floristic composition. Physiognomy includes the general outward appearance or external morphology of a plant community (ecological structure is to the plant community what morphological and physiological structures are to the plant) while floristic composition is concerned primarily with species which are constantly preponderant either numerically or in mass effect. Layer and group societies are plant communities of subordinate rank within the association. The association is regarded as an organic entity, plant societies bearing a relation to the association somewhat analogous to that borne by the various organs of an individual plant to the plant as a whole. The term association is recognized as applicable both to the abstract vegetation concept and to the concrete individual pieces of vegetation on which this concept is based. Habitat includes everything relating to the factors operative in a geographically definite locality, so far as these factors influence plants. A distinction is made between the general habitat relations of the association as a whole and the specific habitat relations of its constituent elements. Habitat factors are divided into climatic, physiographic, biotic, anthropic (human), and pyric (fire). The 1st is subdivided into regional and local climatic factors, rhythmical and progressive changes in climate, and other atmospheric influences. Physiographic factors are topographic and edaphic, rhythmical and progressive changes in physiography, and other physiographic influences. Biotic habitat factors are shade, root competition, humus, micro-organisms in the soil, plant and animal invasion, and other biotic influences. (To be concluded).—*J. E. Weaver.*

3825. OLSEN, CARSTEN. Studies on the hydrogen ion concentration of the soil and its significance to the vegetation, especially to the natural distribution of plants. *Compt. Rend. Trav. Lab. Carlsberg* (Copenhagen) 15¹: 1-166. 27 fig. 1923.—This is a detailed presentation of data upon which a preliminary report has been issued. The investigation, begun in 1916, comprises field observations and cultural experiments extending over 4 years.—Methods for colorimetric determination of H-ion concentration in soil extracts are described; the results of colorimetric and electrometric determinations are compared, generally with agreement within 0.2 pH; both methods have been used in this study. The homogeneity and constancy of the H-ion concentration of the soil were investigated and a comparison made of the acidity shown by the "soil liquid" (obtained by pressure) and the "soil extract" prepared with varying proportions of water. Considerable buffer action was observed in extracts in contact with soil, but very little in filtered extracts. No essential differences in reaction were found in soils taken at depths of 5-20 cm. The quantity of nitrate and ammonia present, as well as their rates of formation, were investigated in soils from the habitats studied, and account also was taken of differences in soil moisture content, level of water table, light intensity, and content of potassium, phosphorus and calcium. The distribution and density of vegetation were determined quantitatively using replicated quadrats 0.1 m. square, and expressing the frequency as

per cent of the number of individuals of the dominant species. The species frequencies are correlated with the H-ion concentration of the soil in 10 tables for each of the meadow and woodland formations, covering the range pH 3.5-8.0 in steps of 0.5 pH. From these tables summarizing tables are prepared showing the average frequency in each pH class of meadow plants from 78 localities and of woodland plants from nearly 200. The author concludes that the H-ion concentration of the soil has an important effect on the composition of plant associations; each species is in general found only within a certain range of H-ion concentration; within this range there is a narrower range in which the species has its greatest average frequency. For some species the wider range is only 3 pH classes; for others it may be 5-6 classes; the narrower range of maximum frequency is usually 1-2 classes. Comparatively few species are sufficiently precise indicators individually to afford a guide to the soil reaction, but when an association consisted of a number of species, the average pH class of their mean maximum frequencies, as determined from the tables, was found to include the H-ion concentration experimentally found.—The greater number of species are found in soils which approach neutrality; also habitats which are approximately neutral are richer in species than those decidedly acid or alkaline.—These conclusions were tested experimentally by growing plants appearing to have different optimal soil reactions in native soils with pH range 3.6-7.7; and in solution cultures in which the reaction was adjusted to a similar range, and maintained by constant drip or by aeration. Typical acid soil plants as *Deschampsia flexuosa* and *Senecio silvaticus* always showed the greatest growth in media of pH 4.5-5.0; they were chlorotic and severely stunted in neutral or alkaline media. Neutral or alkaline soil plants as *Poterium sanguisorba* and *Tussilago farfara* were most vigorous in media of pH 6.5-7.0. The fact that these plants did not become chlorotic in sub-neutral media shows that lack of available iron was not the cause of the poor growth of acid soil plants in similar media. Only aquatics, as *Helodea canadensis*, were found to thrive in alkaline solutions. It is held that in alkaline soils the water film in contact with plants roots must always be slightly acid due to liberation of CO_2 by the roots.—Experiments were conducted to determine the effect of ammonia as compared with nitrate as a source of nitrogen for acid and neutral soil plants. When their respective acid- and alkaline-producing natures were neutralized even the neutral soil plants grew well with ammonia as the sole source of nitrogen. Acid soils are typically high in NH_3 , but that plants characteristic of these habitats are more influenced by the H-ion concentration than the ammonia content of the soil was shown by their poor growth in highly acid media containing NH_4Cl , and their vigorous growth in less acid media containing equivalent amounts of NH_4NO_3 .—A tendency to vary in parallel manner was shown in the H-ion concentration of the cell sap and that of the medium in which the plant grew.—No ability on the part of the plants to alter the reaction of solution cultures toward a presumably optimum point was observed. Variations in reaction during growth were traceable to the source of nitrogen, the reaction becoming acid if nitrogen were furnished as ammonia, and alkaline if furnished as nitrate. In a "physiologically neutral" solution containing both ammonia and nitrate no change of reaction occurred. Critical values were reached in the acid direction first by neutral-soil plants and in the alkaline direction by acid-soil plants.—That the presence of aluminum in acid soils is not the sole cause of the avoidance of such soils by neutral-soil plants was shown by the vigorous growth of *Tussilago* in a solution containing Al provided the reaction were kept neutral. Al ions really are toxic to some plants, as barley, and may cause an effect independent of their acid-producing nature on hydrolysis by precipitating phosphoric acid.—F. Weiss.

3826. OLSEN, CARSTEN. The concentration of hydrogen ions in the soil. *Science* 54: 539-541. 1921.—This is a somewhat detailed abstract of the article noted in the preceding entry.—C. J. Lyon.

3827. PALMER, ERNEST J. The Red River forest at Fulton, Arkansas. *Jour. Arnold Arboretum* 4: 8-33. 1923.—The author presents a general account of the forest flora of the southwestern states and cites a number of localities where a remarkably large number of ligneous species occur. Especially Fulton, Arkansas, which is described in its phytogeographical aspects and of which the ligneous plants found within a radius of about 5 km. are listed,

comprising nearly 200 species and varieties of trees and shrubs. Two new supposed oak hybrids are mentioned, *Quercus nigra* \times *A. Shumardii* and *Q. Durandii* \times *Q. stellata*; and 1 new variety, *Forestiera acuminata* var. *vestita* is described.—ALFRED REHDER.

3828. WANGERIN, WALTHER. *Die Grundfragen der Pflanzensoziologie.* [The fundamental problems of plant sociology.] *Naturwissenschaften* 10: 574-582. 1922.

STRUCTURE, BEHAVIOR, SYMBIOSIS

3829. BEQUAERT, J. *Ants in their diverse relations to the plant world.* *Bull. Amer. Mus. Nat. Hist.* 45: 333-583. *Pl.* 26-29, *fig.* 77-100. 1922.—The author summarizes what is known of these varied and often intricate relations as follows: Economic importance of ants; ants as agents in the pollination of flowers; ants and extrafloral nectaries; dispersal of seed by ants; harvesting ants; ants and epiphytes; gall-inhabiting ants; fungus-growing ants; fungus parasites of ants (*Cordyceps*, *Isaria*, *Stilbum*, *Rickia*, and *Laboulbenia*); intracellular bacteria of ants; a review of African myrmecophytes (*Schotia*, *Macaranga*, *Cola*, *Scaphopetalum*, *Barteria*, *Epitaberna*, *Vitex*, *Uncaria*, *Sarcocephalus*, *Randia*, *Plectronia*, and *Cuviera*); synopsis of the literature of recorded myrmecophytes of the world; bibliography of the relations between plants and ants.—Frank E. Lutz.

3830. BOUGET, JOSEPH. *Observations sur l'optimum d'altitude pour la coloration des fleurs.* [Observations on the optimum altitude for the coloration of flowers.] *Compt. Rend. Acad. Sci. Paris* 174: 1723-1724. 1922.—A study is made of *Hepatica triloba* in the Pyrenees. Plants with white flowers lose their leaves, while those with red or blue flowers retain them all winter. The most brilliant colors occur between 700 and 1000 m. on the north slopes in the shade. At the highest altitudes for this species (up to 2000 m.) the flowers are all white. If planted at 2,850 m. all plants become white. If planted at 500-600 m. the flowers are nearly white. *Ramondia pyrenaica* and *Horminum pyrenaicum* give similar results.—C. H. Farr.

3831. CATALANO, GUISEPPE. *Determinazione razionale della xerofilia.* [Rational determination of xerophily.] *Bull. R. Orto Bot. Palermo* 2: 171-221. 1921.—Xerophily is defined as the faculty, present in all autotrophic plants, of living and reacting to a dry habitat by means of physiological adaptation in the time (xerophilous tendency) and adaptation in form and matter in the physical space occupied by the plant structure (xerophilous organization).—Edith K. Cash.

3832. COCKERELL, T. D. A. *Bees of the genus Panurginus obtained by the American Museum Rocky Mountain expeditions.* *Amer. Mus. Novitates* 36. 10 p. 1922.—This paper and those cited in the following 6 entries are chiefly entomological, but they also contain scattered records of flower visits by bees.—Frank E. Lutz.

3833. COCKERELL, T. D. A. *Bees of the genus perdita from the western states.* *Amer. Mus. Novitates* 33. 15 p. 1922.

3834. COCKERELL, T. D. A. *Notes on some western bees.* *Amer. Mus. Novitates* 40. 7 p. 1922.

3835. COCKERELL, T. D. A. *Some parasitic Megachilid bees of the western United States.* *Amer. Mus. Novitates* 21. 11 p. 1921.

3836. COCKERELL, T. D. A. *The Epeoline bees of the American Museum Rocky Mountain expeditions.* *Amer. Mus. Novitates* 23. 16 p. 1921.

3837. COCKERELL, T. D. A. *Two new subgenera of North American bees.* *Amer. Mus. Novitates* 47. 5 p. 1922.

3338. COCKERELL, T. D. A. Western bees obtained by the American Museum expeditions. Amer. Mus. Novitates 24. 15 p. 1921.—Largely entomological but contains scattered records of flower-visits by bees.—*Frank E. Lutz.*

3339. FRISON, THEODORE H. Report on the Bremidae collected by the Crocker Land Expedition, 1913-1917. Bull. Amer. Mus. Nat. Hist. 41: 451-459. Pl. 24. 1919.—This paper is largely entomological but contains a short section on the anthophilous habits of Arctic bumblebees.—*Frank E. Lutz.*

3340. GATES, F. C. Influence of moonlight on movements of leguminous leaflets. Ecology 4: 37-39. 1923.—Observations were made at night upon the behavior of the leaves of a number of leguminous plants found in the Philippines, where the temperature was never low enough to counteract any influence moonlight might exert. When the nights were clear and not too humid, the strong moonlight effected the partial resumption of the day position of the leaflets, and also caused the opening of the stomata in at least a few instances. The effects were most pronounced on plants having rather large leaflets, but even then were never carried to completion as they are during the change from night to day.—*John W. Crist.*

3341. LARBAUD, MARGUERITE. Anatomie des fleurs d'une même espèce à diverses altitudes. [Anatomy of flowers of the same species at different altitudes.] Compt. Rend. Acad. Sci. Paris 174: 1562-1564. 1922.—*Silene inflata* is particularly studied. At low and high altitudes the flowers are of the same size though fewer in number, but the vegetative part of the plant is proportionately reduced in the mountains. The differences in the morphology and histology of the flower parts at high and low altitudes are described. In general the cells are smaller, about $\frac{1}{5}$ — $\frac{3}{4}$, and the tissue of the flowers more compact. The opening of the anthers is more precocious in the mountains, and the pollen grains are a little smaller.—*C. H. Farr.*

3342. LEBOUR, MARIE V. The food of plankton organisms. Jour. Marine Biol. Assoc. United Kingdom 12: 644-677. 1922.—The marine plankton organisms in the Plymouth region the food of which consists chiefly of diatoms, include most of the common copepods, decapod larvae (excluding the larval lobster and crab megalopae), echinoderm larvae, mollusk larvae, most of the common forms of annelid larvae, *Cyphonautes* (of the Polyzoa), *Tomopteris helgolandicus* (of the Annelida), and *Tornaria* larvae (of the Enteropneusta). Organisms feeding largely on Peridineae include *Actinotrocha* (of the Phoronidea) and the Tintinnids (of the Protozoa).—*Marshall A. Howe.*

3343. LUTZ, FRANK E., and T. D. A. COCKERELL. Notes on the distribution and bibliography of North American bees of the Families Apidae, Meliponidae, Bombidae, Euglossidae, and Anthophoridae. Bull. Amer. Mus. Nat. Hist. 42: 491-641. 1920.—This paper cites numerous records of flower-visits by bees.—*Frank E. Lutz.*

3344. TROLL, KARL. Die Entfaltungsbewegungen der Blütenstiele und ihre biologische Bedeutung. [The biological significance of the movements of the flowerstalk.] Flora 115: 293-392. Pl. 4-10, 3 fig. 1922.—Comparative studies, supported by experiment, of pre- and postfloral movements in many species covering a wide range of families, give little support for the theory that such movements are adaptive responses of significance in the struggle for existence. In many cases they are conditioned by the organization of the inflorescence, e. g., in species of such families as the Commelinaceae, Droseraceae, Oxalidaceae, and Boraginaceae in which the inflorescence is a dichasium or a derived type. Such movements are effected by geotropism and epinasty. The similarity of movement in species of *Oxalis* of various habits, habitats, and climates presents many difficulties for the theory of adaptive responses. On the other hand, there is often more or less convergence in type of movement in unrelated forms which live under similar conditions (*Limnanthemum nymphaeoides* and *Hydrocleis*, *Vallisneria* and *Nymphaea candida*, *Oxalis acetosella* and *Viola septentrionalis*). Similarity of organization enables them to live under similar conditions although other types are possible; it is not a question of necessity but of possibility.—*A. G. Stoekey.*

3845. WÜST. Die erste und letzte Tracht im Jahre. [The first and last blossoms of the year.] Bienenpflege 44: 12-13. 1922.—Descriptions are given of the first and last blossoms of the year which attract bees. *Helianthus* is a late bloomer which is frequently visited by bees.—M. G. Dadant.

VEGETATION

3846. ARRHENIUS, O. Statistical investigations in the constitution of plant associations Ecology 4: 68-73. 1923.—It has been noticed that on areas increasing in size from y to y_1 the number of species found increases from x to x_1 according to the empirical formula $\frac{x}{x_1} = \left(\frac{y}{y_1}\right)^n$ where n is a constant. Within certain limits this approximation formula holds well for plant communities. Some associations increase their number of species very slowly, others very rapidly, and n has high and low numerical values accordingly; in other words rich types of association have a low n value and the poor ones a high one. The n -values for different associations are given and range from 1.8 to 12.5, the majority being between 2 and 3, with an average for the whole of 3.7. When the area increases very much the calculated value is higher than the observed one. It has been found that the distribution of species over an area follows the laws of probability; or, mathematically stated, if n individuals of a species are found n times on the area $\frac{Y}{n}$ the probability, a , of finding it on a smaller area y is $aY = y$ or $aY = Y + y$ or $a = 1 - (1 - \frac{y}{Y})$. The total of a values equals the probable number of species on the area y . Where Y is very large and n and y small, it has been observed that when the area increases geometrically the number of species likewise increases up to a certain limit, but when n and y are comparatively large the limit is soon reached. The formula has been found to hold very well for associations and agglomerations of communities in Sweden, Finland, Switzerland and Java.—T. J. Fitzpatrick.

3847. BATES, C. G. The transect of a mountain valley. Ecology 4: 54-62. 3 fig. 1923.—From a former extensive investigation in Colorado the conclusion was reached that the zonal distribution of the important forest trees of opposing slopes at the same elevation is due mainly to differences in insolation and its effects upon the soil surface. Since no measurements of light intensity were made, and other data were somewhat unsatisfactory, the present effort was aimed to test this conclusion. A valley was chosen with an axis lying east and west and bounded on either side by ridges only 700 feet apart. On a transect line normal to the contours on both slopes, 14 stations 50 feet apart were established and data gathered, beginning in July, on evaporation, soil temperature at the surface and at 1-foot depth, and soil moisture. The south exposure bears a stand of western yellow pine beginning to be invaded from the top by Douglas fir. The author ascribes this condition to the habit of prompt germination and immediate deep rooting of yellow pine, thus enabling it to succeed on a slope where the striking feature is the rapidity with which the surface moisture may drop below the wilting point. Douglas fir equals yellow pine in these respects but not in its ability to withstand the higher surface temperatures prevailing farther down the slope. The north slope has a cover of Engelmann spruce at its base and a forest of Douglas fir extending to the top. The lack of fir and the presence of spruce in the base area is thought to be due to (a) invasion by spruce when denuded, or (b) factors such as coldness of the site, lack of sunlight, etc., inimical to the more heat-demanding fir, or (c) soil quality unfavorable for fir.—John W. Crist.

3848. BOETTGER, CAESAR R. Meine Exkursion zur spanischen Kolonie Rio de Oro in Westafrika. [My excursion to the Spanish colony of Rio de Oro in West Africa.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 51: 18-31, 72-84, 167-173. 1 map. 1921.—In this popular account of Rio de Oro the author includes a few observations on the vegetation, calling attention to the great abundance of the Chenopodiaceae and designating the cactus-like Euphorbiae as the most striking plants of the region.—A. W. Evans.

3849. CAMPBELL, ELMER GRANT. Some aspects of Stone Mountain, Georgia, and its vegetation. *Proc. Indiana Acad. Sci.* 1921: 91-100. 11 photo. 1922.—Only lichens are found on the north slope, which is a vertical unbroken wall, but a dense forest of broad-leaved trees and herbaceous plants is found on the narrow rich talus. On the steep south slope grow conifers and flowering herbs, and on the broad south talus an almost pure stand of pine which merges into deciduous trees. The east and west slopes seem to have floras blending between those on the north and south.—*F. C. Anderson.*

3850. CHRISTENSEN, CARL. Om Vegetationen paa Høvblege. [Vegetation of Høvblege.] *Bot. Tidsskr.* 37: 421-432. 1922.—“Høvblege” is defined as the part of a cliff or hill which is devoid of trees and lies to the southwest part of the woody cliffs. Ostenfeld, in an article in *Naturens Verden* first called attention to the special vegetation of these areas, or island cliffs. The particular type of vegetation was that of Central Europe in that there were 4 distinct associations dominated by *Linum austriacum*, *Onobrychis sativa*, *Poterium polygnum*, and *Reseda lutea*, respectively. These island areas have been known for a long time for their orchids, but no specific study had been made. In 1922, Christensen, with K. Wünnstedt, made a physiographic ecological study of the various species and their distribution, employing the Raunkiaer statistical method.—*A. L. Bakke.*

3851. DICE, L. R. Notes on the communities of the vertebrates of Riley County, Kansas, with especial reference to amphibians, reptiles, and mammals. *Ecology* 4: 40-53. 1923.—Much of this article deals with vegetation. The names of many of the animal communities mentioned are suggestive of this, as: willow-poplar, valley forest, hillside forest, thicket, sumac, meadow, prairie, cultivated-field, orchard, ruderal, etc. In practically all the communities the vegetation is given, the dominant species listed, and important observations on the structure of the plant communities included.—*T. J. Fitzpatrick.*

3852. LARSEN, J. A. Association of trees, shrubs, and other vegetation in the northern Idaho forests. *Ecology* 4: 63-67. 1923.—The most common herbs, shrubs, and trees in the forests of northern Idaho are listed to afford a better insight into the quality and general characteristics of the habitat. The forest types show differences with increasing altitude, passing from nearly pure yellow pine, bordering the Columbia River Plateau, through western larch, Douglas fir with some yellow pine at higher elevations, and white pine, western hemlock, western red cedar, and lowland white fir on still higher and rougher ground. Above these altitudinally are the sub-alpine forests of mountain hemlock, alpine fir, Engelmann spruce, and lodge-pole pine. These belts often overlap broadly. The mean annual precipitation varies 18-20 inches in the yellow pine association to 27-35 inches in the western white pine community, prolonged drought occurring in the summer. The mean growing season (May to September) has a temperature of 60-65°F. in the yellow pine and 54-60°F. in the white pine community. Plant lists give the most frequent and typical species only.—*J. E. Weaver.*

3853. LAUTERBACH, L. Die Salzflora von Nauheim und Wisselsheim. [The saline flora of Nauheim and Wisselsheim.] *Ber. Senckenberg. Naturf. Ges. Frankfurt a. M.* 50: 143-152. 13 fig. 1920.—In the vicinity of the saline springs at Nauheim and Wisselsheim, Germany, a number of characteristic seashore plants occur and stand in sharp contrast to the usual vegetation of the district. The author illustrates and gives non-technical descriptions of the following saline species: *Atriplex patulum* var. *salinum*, *Erythraea pulchella*, *Festuca distans*, *Glauz maritima*, *Hordeum secalinum*, *Juncus gerardi*, *Plantago maritima*, *Salicornia herbacea*, *Scirpus maritimus*, *S. tabernaemontanus*, *Spergularia salina*, *Triglochin maritima*, and *Zannichellia palustris*. He calls attention also to the danger of extinction to which such plants are exposed in a highly developed agricultural region and lists several saline species that have already disappeared.—*A. W. Evans.*

3854. NEEDHAM, J. G., C. JUDAY, E. MOORE, C. K. SIBLEY, and J. W. TITCOMB. A biological survey of Lake George, N. Y. 78 p. 27 fig. State of New York Conservation Commission: 1922.—A comprehensive biological study was made with special reference to fish production.

Needham describes the hydrography and environment, and the vegetation and its turnovers into fish food. He discusses fish protection and propagation and offers recommendations to improve the fishing.—Juday records limnological observations on the temperature of the lake waters, transparency, dissolved gases, and plankton. Quantitative studies show the total yield of plankton forms and bottom fauna at the time of observation with every indication that an abundance of food materials is developed. The relative importance of certain organisms from the standpoint of fish food is pointed out.—Moore considers the primary sources of food of a number of important fishes of the lake, giving illustrations of food staples and food chains. Plant and animal associations, and limiting factors are discussed.—Sibley gives an annotated list of the fishes of the lake and a food census of the adults.—Titcomb gives the purpose of the investigation, makes several fish cultural observations and offers general recommendations from the standpoint of the fish culturist.—*E. Moore.*

3855. SEWARD, A. C. *A summer in Greenland*. 100 p., 47 fig. University Press: Cambridge, 1922.—A popular account of the geography, geology, people, and customs is given, with chapters on flora and fossil plants. Greenland has over 400 species of flowering plants, mostly circumpolar, only 1 endemic. The only trees are willows and birches, reaching a height of 18 feet with stems 1 inch in diameter at age of 100 years. The soil is thawed in summer to a depth of 2-6 feet. All roots are wide spread and superficial. Greenland is a rich field for fossil plants and glacial deposits. Marine drift from great distances may be mixed in glacial deposits with indigenous remains.—*Forrest Shreve.*

3856. THONE, FRANK. *Ecological factors in region of Starved Rock, Illinois*. Bot. Gaz. 74: 345-368. Fig. 1-5. 1922.—The region studied is one showing diverse habitats carrying diverse vegetation complexes derived from "the glacial relicts left behind by the northern retreat of the first post-Pleistocene flora, outliers from the mesophytic southeastern forests, forerunners of the western and southwestern plains, and desert types." The author's summary follows: This paper is a study of the ecological factors at 7 representative topographical points during the growing season of 1921. The factors studied were soil moisture, evaporating power of the air, evaporating power of solar radiation and temperature of air and soil. Observations were taken with special reference to their influence on seedling growth, because of the importance of the latter as a factor in succession. Soil moisture was found to vary (a) seasonally, falling off after the close of the spring rains and reaching a point below the minimum necessary for plant growth during a considerable portion of the summer, and rising again with the beginning of the fall rains; (b) according to the mechanical composition (and therefore retentivity) of the soil; (c) to a minor extent according to topography; and (d) according to the density of the foliage canopy. The evaporating power of the air was found to vary (a) seasonally, increasing until midsummer and falling off afterward; (b) according to the state of tree foliation, declining after the forest had become completely clothed; and (c) topographically, being greatest for the same period in exposed stations and least in sheltered ones. The evaporating power of solar radiation was found to vary in the same manner as the evaporating power of the air, complementing and emphasizing the data under the latter head. Maximum temperatures were found to vary in much the same manner as the evaporating power of the air. Minimum temperatures of the air were found to be affected by topography in a mode inverse to that of the maxima, being highest at the low lying stations and lowest at the higher lying ones. Certain vegetational phenomena showed a general correlation with the instrumental observations: (a) the density of ground cover, number of tree seedlings, and proportion of annuals in the total vegetation of any given association bore an inverse relation to the relative xerophytism; (b) in all but one of the stations conditions were favorable for the development of seedlings only in spring and fall; (c) in the climax forest for the region (upland oak woods) the water-supplying power of the soil consistently fell nearly or quite to zero during the summer drought period; (d) the location of "subclimax" and "superclimax" associations showed closer correlation with water relations than with temperature.—*B. W. Wells.*

APPLIED ECOLOGY

3857. ALFONSUS, ALOIS. Ueber die Errichtung von Pflanzgarten. [The establishment of the gardens.] Deutsche Imker 36: 36. 1923.—Varieties of bee plants are given adapted to the small garden.—*M. G. Dadant.*

3858. BALDWIN, E. G. The honey regions of Florida. Amer. Bee Jour. 62: 150-153. Fig. 1-5. 1922.—The most important honey plants in Florida are *Nyssa aquatica*, *N. biflora*, orange, *Cassia chamaecrista*, *Castanea pumila*, *Sabal megacarpa*, *S. Palmetto*, *Avicennia nitida*, *Ilex glabra*, *Hippomane Mancinella*, *Satureja rigida*, and *Mesophaerum spicatum*. Because of the great extension southward of peninsular Florida the honey flora and conditions of bee culture differ widely in the northern and southern portions of the state.—*J. H. Lovell.*

3859. BUCHEGGER, JOSEF. Die Goldrute und ihr Anbau. [The goldenrod and its cultivation.] Tiroler Bienenzeitg. 9: 12. 1922.—The writer describes the best conditions for growing *Solidago canadensis*. It is a desirable addition to the honey flora.—*M. G. Dadant.*

3860. CAMPBELL, S. M. Nectar secretion at high altitudes. Gleanings in Bee Culture 50: 792. 1922.—At high altitudes in the San Francisco Mountains in Arizona more honey is gathered than in the plains.—*J. H. Lovell.*

3861. COBB, L. H. Fall pasture for bees. Amer. Bee Jour. 62: 369. 1922.

3862. COLEMAN, GEO. A. Beekeeping in our California national forests No. II. Honey flora. Western Honey Bee 11: 23-25. 1922.—*Salvia Columbaria* blooms Apr.-May and yields an excellent white honey. *S. mellifera* is the most important honey plant in its range (Mt. Diablo southward to San Diego County), blooms Apr. -July 15, and yields a water-white honey of excellent flavor. *S. apiana* blooms March-May and yields white honey of fine flavor. *S. sonomensis* blooms May-June and yields a honey similar to that of white sage. *Koellia californica* and *Monardella villosa* are minor honey plants in the Coast Ranges. *Artemisia californica* is valuable for its abundant pollen. *Solidago californica*, common on dry plains, is a valuable honey plant Sept.-Dec. *Baccharis pilularis* is common in the Coast Ranges and furnishes a large amount of honey.—*J. H. Lovell.*

3863. DAVIDSON, JOHN. Factors affecting nectar secretion in flowers. Amer. Bee Jour. 62: 153-154. 1922.

3864. ENGLE, M. C. Beekeeping in Cuba. Beekeepers' Rev. 36: 9. 1922.—Beekeeping at Herradura is briefly described.—*J. H. Lovell.*

3865. HOLMES, T. E. Beekeeping in the Idaho Panhandle. York's Bees and Honey 31^o: 6. 1922.—Notes are given on the honey plants of northern Idaho. The main sources of honey are fireweed and clover.—*J. H. Lovell.*

3866. HOLST, AXEL. Beekeeping in the Virgin Islands. Amer. Bee Jour. 62: 57-58. 1922.—Ninety per cent of the honey is gathered from trees and is mostly dark in color. There are 2 heavy honey flows, 1 in spring and 1 in fall. A list of the more important honey plants is given.—*J. H. Lovell.*

3867. HOLST, AXEL. Nectar secretion in the tropics. Amer. Bee Jour. 62: 265. 1922.

3868. LUND, JOHN. Alfalfa yields in the East. Gleanings in Bee Culture 50: 642. 1922.—At Landenburg, Pennsylvania, bloom of the 2nd crop of *Medicago sativa* yielded a surplus of honey, some colonies storing 40 pounds. Alfalfa allowed to stand produced a big crop of seed.—*J. H. Lovell.*

3869. MOORE, B. An interesting example of applied ecology. [Rev. of: JARDINE, J. T., and C. L. FORSLING. [Range and cattle management during drought. U. S. Dept. Agric. Bull. 1031. 1922.] Ecology 4: 82-84. 1922.

3870. PARKS, H. B. Agarita, guajillo and mesquite. Amer. Bee Jour. 62: 412-413. Fig. 1-4. 1922.—Agarita (*Berberis trifoliata*), abundant on the limestone hills of the Edwards Escarpment, Texas, blooms in early spring and is said to yield a light amber honey of good flavor. Guajillo (*Acacia Berlandieri*), common on the dry stony ridges of southern Texas, secretes a large amount of nectar. The honey, which is a very light amber color or milky white, with a mild, excellent flavor, granulates quickly. Mesquite (*Prosopis glandulosa*), yielding a light amber honey of fair quality, is common in southern Texas but not reliable every year.—J. H. Lovell.

3871. PARKS, H. B. Phacelia. Amer. Bee Jour. 62: 213. 1922.—*Phacelia integrifolia* is abundant along the Edwards Escarpment, Texas, and is very attractive to bees.—J. H. Lovell.

3872. PARKS, H. B. The blue bonnets as an aid to the bees. Beekeepers' Item 6: 137-138. Fig. 1. 1922.—*Lupinus subcarnosus* is most common in Texas between the Trinity and Sulphur Rivers and the high plain area and is adapted to limestone soil. Lupines are all nectarless, though this species is often erroneously reported by Texas beekeepers to yield small amounts of nectar. It is a valuable pollen flower, large quantities of orange-red pollen being gathered by bees. It is recommended as an ornamental.—J. H. Lovell.

3873. PELLETT, F. C. Beekeeping in Manitoba. Amer. Bee Jour. 62: 497-500. Fig. 1-6. 1922.—An account is given of conditions on the prairie and in the bush in the country about Winnipeg. South and west is level prairie, while north and east the land is covered with small poplars and other quick-growing trees. Immense crops of wheat, oats, and barley are grown. Large crops of honey are secured from *Cirsium arvense*, *Grindelia squarrosa*, *Melilotus alba*, *Tilia americana*, *Taraxacum officinale*, *Medicago sativa*, *Symphoricarpos racemosus*, asters, and goldenrods. An average of 150 pounds per colony is usual in well-cared-for apiaries.—J. H. Lovell.

3874. RAGGATT, H. W. Beekeeping in Australia. Gleanings in Bee Culture 50: 773. 1922.—Eucalyptus yields 95 per cent of Australian honey, most apiaries being located in forests. Out of every 5 years, 2 are good, 2 poor to medium, and 1 very poor. Lack of pollen often causes loss of many colonies.—J. H. Lovell.

3875. RICHTER, M. C. Migratory beekeeping. Gleanings in Bee Culture 50: 436-438. Fig. 1-2. 1922.—Brief mention is made of the more important sources of honey in California.—J. H. Lovell.

3876. RICHTER, M. C. Regional differences in California. Amer. Bee Jour. 62: 358-360. Fig. 1-6. 1922.—Five climatic regions are recognized in California: (1) Northern coast region, not adapted to beekeeping as there are few honey plants, and the summer is cool and damp. The spring bloom includes *Arctostaphylos manzanita*, *Ceanothus cuneatus*, *Erodium cicutarium*, and *Medicago hispida*. Later blooming honey plants are white clover, white sweet clover and alfalfa. (2) Central coast region near Sacramento, depending for its surplus honey on fruit bloom, wild mustard, cultivated asparagus and onions, sweet clover, and alfalfa. Large amounts of honeydew are also gathered. South in this region the honey flora includes *Salvia mellifera*, *Lotus glabra*, *Eriogonum fasciculatum*, and manzanita. (3) Southern coast region, which has yielded most of the large crops of California honey. The honey plants are *Salvia mellifera*, *S. apiana*, *S. leucophylla*, orange, Eucalyptus, lima bean, *Lotus glabra*, *Eriogonum fasciculatum*, *Rhus diversiloba*, *Hemizonia fasciculata*, *Trichostema lanceolatum*, and others. (4) Interior valley region, including Great Central Valley and Imperial Valley. Irrigated alfalfa is the principal honey plant. Other sources are fruit bloom, white sweet clover, Euca-

lyptus, melons, *Wislizenia refracta*, *Hemizonia fasciculata*, and *Trichostema lanceolatum*. In the Imperial Valley cotton yields a large amount of honey. (5) The mountain-plateau region, which has been little explored. Alfalfa is the chief honey plant, and sweet clover and *Eriogonum fasciculatum* are important in the fall. *Chrysothamnus nauseosus* yields a dark, ill-flavored honey. The Owens Valley in Inyo County is an excellent location.—*J. H. Lovell*.

3877. RICHTER, M. C. **The California orange flow.** *Gleanings in Bee Culture* 50: 76-78. *Fig. 1-8.* 1922.—Comparatively cool nights followed by warm days, the temperature rising to 85-95°F., results in very rapid nectar secretion; 15-20 pounds of honey may be stored daily. The orange flow may last only 10 days or extend over a month.—*J. H. Lovell*.

3878. S., G. L. **Honey plants of Oregon.** *Western Honey Bee* 10: 313-314. 1922.—Several species of *Vaccinium* are abundant in Oregon, but their relative value as honey plants is unknown. *V. parvifolium* yields a light amber honey of mild peculiar flavor, very thick and waxy, and difficult to extract.—*J. H. Lovell*.

3879. SKLENAR, GUIDO. **Götterbaum.** [Tree of heaven.] *Leipziger Bienenzeitg.* 37: 49. 1922.—The conditions governing the production of honey by the flowers of this tree are explained. It has been highly praised as desirable in Germany for both shade and nectar.—*M. G. Dadant*.

3880. SLATTERY, J. J. **Sourwood an uncertain yielder.** *Gleanings in Bee Culture* 50: 440. 1922.—At Hendersonville, North Carolina, 100 strong colonies stored 1,100 pounds of honey from *Oxydendrum arboreum*. Every few years this tree yields an enormous amount of honey, but the flow never lasts more than 5 weeks.—*J. H. Lovell*.

3881. SOUTHARD, A. E. **Palestine honey production.** *Beekeepers' Rev.* 36: 8-9. 1922.—There are only 4-5 weeks annually for honey-gathering in Palestine; the dry season lasts from April to October, and the rainy season from November to March. Orange, lavender, mint, wild thyme, Acacia, and cactus flowers are the chief sources of nectar.—*J. H. Lovell*.

3882. SUTER, R., and E. MOORE. **Stream pollution studies.** 84 p., 7 pl., 37 fig. New York State Conservation Commission: 1922. [Also in: State of New York Conservation Commission, eleventh annual report, for the year 1921. Legislative Document No. 29.]—Certain common and easily recognized plants and animals of streams are recommended for practical use as indicators of intensity of pollution. A stream polluted by organic wastes is conveniently divided into 3 zones: zone of recent pollution, septic zone, and zone of recovery, all occurring if the volume of waste is excessive.—Typical indicators of these zones are listed. In the zone of recent pollution may be found *Thiotrix* sp., *Saprolegnia* sp., *Leptomitilus lacteus* Agardh, *Sphaerotilus natans* Kütz., and tubifex worms (*Tubifex tubifex*). Green plants disappear as the lower limit of the zone is reached.—The septic zone, in which the oxygen supply is practically nil, is characterized by *Eristalis tenax* (L.), *Psychoda alternata* Say, *Erioptera* sp. Green plants reappear and reoxygenate the water at the lower limits of this zone. The zone of recovery is characterized by the presence of sludge in which bloodworms multiply excessively, a common form being *Chironomus decorus* Johann. The following fish regarded as tolerant forms frequent this zone, growing fat on the bloodworms: *Catostomus commersonii* Lace., *Ameiurus nebulosus* Les., *Semotilus atromaculatus* Mitch., *Campostoma anomalum* Raf. Other tolerant animals are: *Arctocorixa*, *Pisidium abditum* Hald, *Simulium venustum* Say, *Asellus communis* Say, *Cambarus immunitis* Hagen, and such plants as *Potamogeton pectinatus* L. and *P. americanus* C. & S.—Typical plants of the clean waters are markedly green, including green algae, as *Hydrodictyon reticulatum* (L.) Lagerh., and water mosses, as *Hypnum riparium*. Game fishes appearing in these waters are: *Micropterus dolomieu* Lace., *Salvelinus fontinalis* Mitch., *Salmo salar sebago* Gir, *Micropterus salmoides*.—A brief general discussion is given of the energy and food relations of plants and animals followed by a consideration of their requirements in the different zones of pollution.—The limits of tolerance of fish to trade wastes are compiled in a table. Authorities are cited.—*E. Moore*.

3883. WEIPPLE, THEODOR. Unter welchem Bedingungen empfiehlt sich die Einbürgerung der Goldrute? [What conditions are necessary for the introduction of the golden rod?] Illus. Monatsbl. Bienenzucht. 23: 25-26. 1923.—Further particulars are given as to methods of growing goldenrod in America with notes on the possibilities of its introduction into Continental Europe.—*M. G. Dadant.*

3884. WILDER, J. J. Chinaberry. Dixie Beekeeper 31^o: 24. 1922.—*Sapindus Drummondii* blooms in southeastern Georgia late in March but yields no surplus as the nectar is used as soon as gathered in stimulating brood-rearing.—*J. H. Lovell.*

3885. WILDER, J. J. Mexican clover. Dixie Beekeeper 44: 10. 1922.—*Richardia scabra* in southeastern Georgia furnished a heavy honey flow during June and July of 1922. The bloom yields heavily only in the morning, from dawn until 10 o'clock; during the heat of the day nectar secretion nearly ceases. The honey has a pleasant flavor and a large surplus is obtained.—*J. H. Lovell.*

3886. WILDER, J. J. Partridge pea. Dixie Beekeeper 44: 20-21. 1922.—The flowers of *Cassia chamaecrista* are nectarless, but extra-floral nectararies on the petioles secrete nectar freely. An average per colony of about 40 pounds of comb honey and 50 pounds of extracted honey is often obtained.—*J. H. Lovell.*

3887. WILLSON, H. B., J. C. DICKMAN, and W. C. BARNARD. Nectar from velvet bean. Gleanings in Bee Culture 50: 774. 1922.—In Mississippi *Mucuna utilis* is reported to secrete nectar freely, but bees do not gather it because of its repulsive taste. In southern Georgia a small surplus is gathered from this source; the honey has a peculiar acid flavor. *Richardia scabra* is a most valuable summer and fall honey plant in Georgia.—*J. H. Lovell.*

3888. WOODS, D. C. The honey industry of Haiti. The Beekeepers' Rev. 37: 7. 1922.—Beekeeping in Haiti is favored by abundant nectariferous plants. Honey from *Haematoxylon campechianum* is nearly white and has a delicate flavor. It may become cloudy in 2-3 months and granulate.—*J. H. Lovell.*

3889. ZEISS. Die einjährige Riesenhonig—(Hubam)—Klee. [The great annual honey plant—Hubam clover.] Bienenpflege 44: 6. 1922.—The discovery of annual white sweet clover and its value to the beekeeper and agriculturist are briefly recounted. The high price of seed has prevented testing in other countries than that in which it was discovered (U. S. A.).—*M. G. Dadant.*

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 3728, 3822, 3823, 3847, 3852, 3873, 4031, 4130, 4290, 4370, 4392, 4484, 4618, 4631, 4670, 4673, 4679, 4702)

3890. ANONYMOUS. A drill for the tree-dentist. Sci. Amer. 126: 259. 1 fig. 1923.—A motor driven tree-drill, with a burr made up of 11 tool-steel circle-saw blades is described.—*Chas. H. Otis.*

3891. ANONYMOUS. Baling trees. Sci. Amer. 127: 340. 1 fig. 1922.—A mechanical packer or baler, as employed by the U. S. Forest Service, is described. It is used preliminary to transporting seedlings from the seed bed to the place of planting.—*Chas. H. Otis.*

3892. ANONYMOUS. Brennstoffmangel und Forstwirtschaft. [Fuel shortage and forestry.] Deutsch. Forstzeitg. 37: 730. 1922.—The fuel shortage has led to heavy cutting of fire wood and use for fuel of timber needed for constructon, etc. The entire timber cut in Germany

would supply only a small fraction of the needed fuel. To save the forests and the wood-using industries, cities and industrial plants must be provided with coal.—*W. N. Sparhawk.*

3893. ANONYMOUS. Determining the penetration of wood preservatives. *Sci. Amer.* 127: 11. 1922.—The tests used by the U. S. Forest Products Laboratory for determining the depth to which wood preservatives penetrate are given.—*Chas. H. Otis.*

3894. ANONYMOUS. Giant trees in the olden days. *Sci. Amer.* 126: 379. 1922.

3895. ANONYMOUS. Introduction of exotics into jarrah forests. *Australian Forest. Jour.* 5: 281-282. 1922.—The propagation of certain valuable exotics in mixture with indigenous species has been successful. Wattles (*Acacia pycnantha*, *A. decurrens*, and *A. dealbata*), *Pinus pinaster*, and *P. halepensis* are noted.—*C. F. Korstian.*

3896. ANONYMOUS. New tanning material. *Australian Forest. Jour.* 5: 219-223. 1922.—The manufacture of mixed tanning extracts, suitably blended, is advocated to relieve the world shortage of vegetable tanning materials. Average tannin content and particulars of distribution are given for several species of *Acacia* and *Eucalyptus* and *Callistris calcarata*. Some are not sufficiently plentiful to be a regular source of tanning extracts but considered collectively they may yield appreciably, incidental to the regular logging operation.—*C. F. Korstian.*

3897. ANONYMOUS. Paper from Australian timber. *Agric. Gaz. New South Wales* 34: 57. 1923.—A good quality of paper has been made from pulp, 60 per cent of which was made from *Eucalyptus regnans*, *E. sieberiana*, and *E. delegatensis*, and 40 per cent being imported sulphite pulp.—*L. R. Waldron.*

3898. ANONYMOUS. Spraying trees from the air. *Sci. Amer.* 126: 333. 1 fig. 1922.—A grove of 500 caterpillar infested catalpa trees was successfully dusted with lead arsenate from an airplane.—*Chas. H. Otis.*

3899. ANONYMOUS. The baobab or bottle-tree. *Australian Forest. Jour.* 5: 279-281. 1922.—*Adansonia Gregorii* is described as one of the characteristic yet unique trees of the savannah, attaining a height of 30-40 feet and a thick barrel- or bottle-shaped trunk 10-18 feet high and 6-20 feet in diameter.—*C. F. Korstian.*

3900. ANONYMOUS. The West Australian red gum. *Australian Forest. Jour.* 5: 203-206. 1922.—*Eucalyptus calophylla*, containing a high percentage of tannins, is suggested as a new tanning material to supplement the waning supply of tan-bark of the 2 wattles, *Acacia pycnantha* and *A. decurrens*.—*C. F. Korstian.*

3901. ANONYMOUS. Timbers of the north Kimberleys. *Australian Forest. Jour.* 5: 130-132. 1922.—Brief descriptions are given for some of the trees occurring as scattered specimens in the "savannah forest."—*C. F. Korstian.*

3902. BADOUX, H. Dégâts par le charançon du sapin. [Depredations of the fir weevil.] *Jour. Forest. Suisse* 73: 68-69. 1922.—The author describes the characteristics and habits of *Pissodes piceae* Ill., which appeared during 1921 in white fir stands. It is not of economic importance unless followed by *Sirex gigas*, a trunk borer. Where this combination is feared, all branches infested with the weevil should be removed and barked, or burned.—*G. Kempff.*

3903. BARBEY, A. Le charançon des aiguilles du sapin. (*Polydrosus pilosus* Gredl). [The fir needle weevil.] *Jour. Forest. Suisse* 72: 186-189. 1 pl. 1921.—The insect and its activities in partially defoliating white fir during the spring of 1921, representing its first serious invasion into Swiss forests, are described. All damage is caused by the adult, mainly during the first 3 weeks in June. The result is a loss of volume increment.—*G. Kempff.*

3904. BAUST. *Durchforstung (Läuterung) von Fichtenschonungen.* [Thinning of young spruce stands.] *Deutsch. Forstzeitg.* 37: 580-582. 1922.—Volunteer pine frequently invades spruce plantations; the former, growing more rapidly and having spreading crowns, may injure the spruce. Such pines should be removed while small; if delayed, too sudden removal may subject the spruce to injury from wind, sun-scald, and snow-breakage.—*W. N. Sparhawk.*

3905. BINDER. *Die Benutzung des Pfluges zur Begründung von Kiefernkulturen auf schlechten Sandböden.* [The use of the plow in establishing pine plantations on poor, sandy soils.] *Forstwiss. Centralbl.* 44: 249-252. 1922.—Contrary to the assertion of Möller, great value is claimed for plowing in establishing pine (or spruce) on poor sandy soils, especially where heather is liable to menace the young trees. Results obtained from plowing and from hacking the soil by hand are compared.—*W. N. Sparhawk.*

3906. DIEDERICH, EUGEN. *Die niederländische Forstwirtschaft.* [Forestry in the Netherlands.] *Forstwiss. Centralbl.* 44: 420-424. 1922.—The forests originally covering most of the Netherlands were early destroyed; by the 13th century it was necessary to import timber from Danzig. In 1833 the forest area was only 169,026 hectares; it gradually increased to 260,923 hectares in 1911, and since then has again decreased, being 247,785 hectares in 1920, or 7.59 per cent of the total land area. The areas of forest are given for individual provinces and by kinds of forest. Conifer high forest covers 134,222 hectares, broadleaf high forest 20,412 hectares, and coppice and willow-holts the remainder. Large areas have been planted since 1889, principally to *Pinus silvestris*, with occasional hardwoods, and along the coasts to the more resistant *P. laricio* vars. *austriaca* and *corsica*.—*W. N. Sparhawk.*

3907. EBERHARD, J. *Neue und alte Betriebsformen.* [New and old cutting systems.] *Forstwiss. Centralbl.* 44: 326-342. 1922.—Characteristics of the various methods of cutting are discussed, with especial reference to the "wedge shelterwood" system (Schirmkeilschlag) developed by Eberhard at Langenbrand. The writer emphasizes the fact that no system can be applied schematically, and that silvicultural methods must be adapted to the multitude of varying conditions met in any forest.—*W. N. Sparhawk.*

3908. FUNKE, G.-L. *Sur les pousses supplémentaires estivales.* [On the supplementary shoots of trees in summer.] *Compt. Rend. Acad. Sci. Paris* 175: 901-904. 1922.—A study was made in the forest of Fontainebleau on the following species: *Carpinus betulus*, *Quercus robur*, *Celtis australis*, *Wistaria sinensis*, *Ligustrum vulgare*, and *Evonymus europæus*. It is concluded that in determining the age of trees by the number of annual rings, the "aught shoots" have not usually constituted a source of error.—*C. H. Farr.*

3909. GILL, WALTER. *Annual progress report upon state forest administration in South Australia for the year 1921-22.* *Ann. Prog. Rept. Woods and Forests Dept. South Australia.* 13 p. Adelaide, 1922.—This routine administrative report discusses general conditions and progress. The area of Forest Reserves is reported as 190,474 acres; 748,033 trees were planted, with a survival of 91 per cent. The revenue for the year amounted to £11,234.—*C. F. Korstian.*

3910. HASTINGS, A. B. *Fighting the forest-fire menace.* *Virginia Geol. Comm. Office of State Forester Bull.* 20. 16 p. 1920.—This popular bulletin is designed to aid in the organized campaign against the fire menace.—*C. F. Korstian.*

3911. HASTINGS, A. B. *Forest wardens' manual.* *Virginia Geol. Comm. Office of State Forester Bull.* 22. 31 p. 1921.—The manual is a handbook of instructions and information for the forest wardens of Virginia.—*C. F. Korstian.*

3912. HECK. *Beiträge zur forstlichen Zuwachskunde.* [Notes on the study of forest increment.] *Forstwiss. Centralbl.* 44: 290-326. 6 fig. 1922.—The author discusses some of

the results of his 24 years of measurements on permanent sample plots of beech, spruce, ash, and fir. The measurements, taken carefully each year, show the very great annual variations in rates of growth which are obscured in periodic (5-year) measurements. It is also shown that trees with straight, clear stems grow at a more rapid rate than others,—a fact of considerable importance in making thinnings. Data are presented showing growth by months during several years. In general, diameters measured in the east-west direction are somewhat greater than in a north-south direction.—*W. N. Sparhawk.*

3913. HELMS, A. **Introducing exotic conifers into New South Wales.** Australian Forest Jour. 5: 27-30, 176-179. 1922.—The climate and forest conditions of the Pacific Northwest (U. S. A.) are discussed with particular reference to *Pseudotsuga taxifolia*. Its yields in the Cascade Mountains of Washington and Oregon are compared with those in Prussia and Denmark. The conclusion is reached that Douglas fir is one of the world's most rapid-growing conifers, producing timber with a wide range of uses. If present experiments result in the successful introduction of this tree into New South Wales it is believed that it will become one of the most important exotics.—*C. F. Korstian.*

3914. HERRMANN. **Bericht über die Waldsamenernte für 1922.** [The 1922 forest-seed crop.] Deutsch. Forstzeitg. 37: 813-816. 1922.—This report discusses the crops of forest tree seeds of the principal species in different parts of Germany.—*W. N. Sparhawk.*

3915. HERRMANN. **Bericht über die Waldsamenernte für 1922.** [Yield of forest seed in 1922.] Deutsch. Forstzeitg. 37: 655-656. 1922.—The prospects of a seed crop of the most important species in different parts of Germany are discussed.—*W. N. Sparhawk.*

3916. HOFMANN, J. V. **Furred forest planters.** Sci. Monthly 16: 280-283. 1923.—The work of rodents is discussed. They may become plentiful enough to prevent seeding, but are usually an important factor in the regeneration of forests.—*L. Pace.*

3917. HOHENADL, W. **Neue Grundlagen der Holzmessung.** [New principles of forest mensuration.] Forstwiss. Centralbl. 44: 55-68, 109-117, 150-159, 184-194, 233-240, 388-399. 1922.—The author discusses the use of higher mathematics in measuring the growth and volume of trees and stands.—*W. N. Sparhawk.*

3918. HOLMES, J. S. **Forest fires in North Carolina during 1918, 1919 and 1920 and forest protection in North Carolina.** North Carolina Geol. and Econ. Surv. Econ. Paper 51. 82 p. 1921.—This bulletin contains information concerning the amount and extent of damage caused by forest fires in North Carolina. The need for greater care in handling fire in and near woods is stressed.—*C. F. Korstian.*

3919. JONES, RICHARD CHAPIN. **The administrative report of the Virginia State Forester for the calendar years 1920-1921.** Virginia Geol. Comm. Office State Forester Bull. 24. 63 p. 1922.—Recommendations for certain additions to present forestry laws and necessary extensions of the work are included.—*C. F. Korstian.*

3920. JONES, RICHARD CHAPIN. **The forest resources of Virginia.** Virginia Geol. Comm. Office State Forester Bull. 19. 11 p. 1919.—The author presents a short account of the character, amount, value, and condition of the forest resources of the state, with a warning that under present destructive practices they are being depleted, and that the industries dependent on them are threatened.—*C. F. Korstian.*

3921. K., S. **Sächsische Wald- und Holzwirtschaft.** [Saxon forest regulation.] Deutsch. Forstzeitg. 37: 538-539. 1922.—The annual cut in Saxon state forests has just been reduced from 800,000 to 500,000 cubic m. This was necessary in spite of the pressing demand for wood because the forests were being overcut and the forest capital reduced. The paper mills of Saxony alone require 1,250,000 cubic m. annually.—*W. N. Sparhawk.*

3922. LEMMEL. Das Problem der volkswirtschaftlichen Produktivität und seine Stellung in der Staatsforstwirtschaft. [The problem of economic productivity and its position in government forest management.] *Zeitschr. Forst.- u. Jagdw.* 54: 129-160. 1922.—This academic discussion covers (1) the problem; (2) the conception of political economy, past, present, and personal; (3) the essence of productiveness; (4) the qualifications of economic productiveness including the determination of the aims of domestic economy as limited by social usage; and the technic.—It is fundamentally unimportant whether the science of politico-economic productiveness is based upon the theory of use or that of cost.—*J. Roesser.*

3923. LEWIS, C. M. Ashes and sawdust the basis of a new industry. *Sci. Amer.* 126: 396. 3 fig. 1922.—Ashes and sawdust are the main ingredients of a cheap composition used as a substitute for cardboard and wood in the manufacture of boxes.—*Chas. H. Otis.*

3924. MATTHÄI. Die waldbauliche Bedeutung der Samenprovenienz bei der Eiche. [Silvicultural importance of origin of seed of oak.] *Forstwiss. Centralbl.* 44: 405-419, 463-484. 2 fig. 1922.—While broadleaf species originally predominated in the forests of Germany, they generally gave way to conifers as the better soils were cleared for agriculture and large clear-cut areas were planted to conifers, which were easier to plant and grew more rapidly than oak, beech, and other hardwoods. As a result of the general impoverishment of the forest soils, foresters realized the need of increasing the proportion of beech and favoring natural reproduction where practicable. As beech and oak together utilize the soil better than either alone, the cultivation of oak was stimulated also. The source of seed for establishing oak stands is therefore of great importance.—The significance of origin of seed is discussed in relation to modern theories of genetics. Those forms of a given species will do best on a given site which have developed on the same or a similar site, as shown for pine, spruce, and larch by Schott, Cieslar, Engler, and others.—On the basis of phenology, 6 zones can be distinguished within the range of the European white oak (sessile and pedunculate oaks): (1) a very early zone with insular climate, where the foliage develops before Apr. 24 and the growing period is over 200 days; (2) an early zone with warm climate, foliage appearing Apr. 24-May 2, and 180-190 days growing season; (3) an early zone with moderately warm climate, leaves appearing May 3-5, with 163-173 days growing season; (4) a late zone with cool climate, vegetation starting May 6-10 and growth lasting 158-162 days; (5) a late zone with cold climate, foliage starting May 11-18 and growth lasting 154-157 days; (6) a very late zone with cold climate, growth starting after May 19 and lasting 145 days or less. The geographical and altitudinal location of these zones is given in some detail. The average growth rates of the oaks developed in the different zones decrease as climatic conditions become less favorable, and growth and yield data must be worked up separately for the several climatic "races." Within each zone the outward forms of the trees have certain distinguishing characteristics; similarly the associated species of trees and smaller vegetation are different.—While Kienitz, Arndt, Hauch, and others have studied the effects of source of seed, much more comprehensive investigations should be undertaken; meanwhile the extreme importance should be recognized of using seed adapted to the site.—*W. N. Sparhawk.*

3925. MELL, C. D. The peer of decorative hardwoods. *Sci. Amer.* 126: 254. 3 fig. 1922.—Rosewood, its source of supply, and former and present uses are described. The largest amount is used in professional and scientific instruments; smaller amounts are used for fixtures, musical instruments, railroad cars, sporting and athletic goods, handles, furniture, etc.—*Chas. H. Otis.*

3926. MÜLLER, H. Die Verjüngung litauischer Kiefern-Fichten-mischbestände. Ein Schwanengesang. [The regeneration of Lithuanian pine-spruce mixed stands. A swan-song.] *Zeitschr. Forst.- u. Jagdw.* 54: 161-170. Fig. 1-2. 1922.—The author discusses clear-cutting versus natural regeneration and sees in the "continuous management" idea a method of conversion from clear-cutting systems to natural regeneration systems. When the author took over the forest district Uszballen in 1913, clear-cutting and artificial regenera-

tion were practiced in the pine-spruce stands on all but 1 compartment. Storm and nun-moth damage in 1913 necessitated a change in the silvicultural system, which led to the selection systems with natural reproduction to fit the needs of individual stands. The problem is discussed, also various technical features concerning the careful cutting of the understory during spruce regeneration—fellings and artificial methods to aid the securing of spruce regeneration.—*J. Roeser*.

3927. O'BYRNE, J. W. The forests of Russell County, Virginia. Virginia Geol. Comm. Office of State Forester Bull. 21. 23 p., 10 pl. 1922.—This bulletin is a continuation of the series of reports on the forest resources of the state, by counties. It describes the forest conditions of Russell County and stresses the necessity of more conservative cutting to prevent depletion of the timber supply.—*C. F. Korstian*.

3928. OELKERS. Kohlensäure und Jahrring. [Carbon dioxide and annual rings.] Zeitschr. Forst.- u. Jagdw. 54: 170-174. 1922.—The author analyzes the desirability of the continuous selection systems. He states that the rate and quantity of wood production depends upon the available CO₂, which is derived mainly through the decomposition of litter and other organic matter on the ground. To increase both CO₂ and wood production, soil culture and protection are necessary. This is accomplished in the continuous selection systems by well executed thinnings which regulate the amount of precipitation and sunshine reaching the soil, the accumulation of a satisfactory quantity and kind of litter on the ground, and the proper distribution of humus.—*J. Roeser*.

3929. PACK, CHARLES LATHROP. Trees as good citizens. 257 p., illus. (partly col.). American Tree Assoc.: Washington, D. C., 1922.

3930. PAESSLER. Über den Gerbstoffgehalt der Douglasienrinde. [The tannin content of Douglas fir bark.] Forstwiss. Centralbl. 44: 245-249. 1922.—Tests on bark from young trees (35-40 years) grown in Bavaria showed 10-18 per cent tannin, with a high sugar content. The tannin content was highest for bark free from the thick corky layer found on older trees. Sheep and goat leather tanned with this material indicated that it has properties intermediate between those of spruce and oak barks. It is suggested that extension of the area planted to Douglas fir may eventually result in a valuable source of raw material for the leather industry.—*W. N. Sparhawk*.

3931. PETRI, L. Ricerche sperimentali sul trattamento elettrico del legno. [Experimental studies on the electrical treatment of wood.] Ann. R. Ist. Superiore Forest. Firenze 6: 23-141. Pl. 1 (col.), fig. 1-20. 1920-1921.—This article treats of the use of the electric current in securing rapid penetration of preservative solutions. Laboratory methods and results are discussed.—*Ferdinand W. Haasis*.

3932. PLANKE. Samenerzeugung geharzter Föhren. [Seed production of pines tapped for resin.] Forstwiss. Centralbl. 44: 172-175. 1922.—Cones of untapped trees (*Pinus silvestris*) averaged 50 per cent heavier and contained 44 per cent more seed; also, seed from untapped trees weighed 30 per cent more than those from tapped trees, and had a percentage germination of 82.5 as compared with 64.5 for seed from tapped trees. The cones, seed, and seedlings from tapped and untapped trees differ in appearance.—*W. N. Sparhawk*.

3933. PRATT, JOSEPH HYDE. Biennial report of the state geologist 1919-1920. Bienn. Rept. North Carolina Geol. and Econ. Surv. 1919/20: 15-27. 1922.—The forestry activities are handled by the Forestry Division, the report of which is summarized under the following captions: demand for timber, present condition, forest fire statistics, protection of watersheds, wood-using industries, study of southern pines, chestnut bark disease, North Carolina Forestry Association, work of the U. S. Forest Service in North Carolina during 1919-1920, and suggested forestry legislation.—*C. F. Korstian*.

3934. PRELLER. *Kiefernkultur und anderes aus der Kassubei*. [Pine culture.] Deutsch. Forstzeitg. 37: 913-917. 1922.—The author describes methods of establishing pine stands on waste lands. Where scattered seed trees were present and the vegetation cover not too dense, satisfactory results were obtained by harrowing strips among and near them. Broadcast seeding on plowed and harrowed land was successful, as were spot-sowing in furrows and planting of cones in furrows. Broadcast seeding immediately following burning off of the brush cover was not successful. Planting on shifting sands is also described, and it is stated that *Pinus banksiana* did not do as well as the native *P. silvestris*.—W. N. Sparhawk.

3935. PUCHNER, H. *Die verzögerte Keimung von Baumsämereien*. [Delayed germination of tree seeds.] Forstwiss. Centralbl. 44: 445-455. 1922.—Germination tests of 100 *Fraxinus excelsior pendula* seed picked from the tree and freed from the husks, and of 100 similar seed dried at 35°C. for 6 weeks, yielded practically identical results. The first seed germinated in 5 months, while germination continued for 6 years, at the end of which 34 undried and 36 dried seed had sprouted. In similar tests of unopened fruits, 7 and 6 per cent, respectively, germinated within 7 years. The 1st undried fruit sprouted in 20 months, the 1st dried one in 2 years. Free seed of *Tilia europea parvifolia* began to germinate in 15 months, and the last one germinated near the end of the 7th year; 14 per cent germinated altogether. Of 100 whole fruits of linden, all decayed without germinating, and of 100 fruits in which a small groove was cut only 1 germinated, after 5 years. These tests indicate the desirability of removing the seed from the fruit in sowing ash, and the futility of sowing whole fruits of linden in any case.—W. N. Sparhawk.

3936. RIEMENSCHNEIDER. *Die Folgen der Trockenheit von 1921*. [Results of the 1921 drought.] Deutsch. Forstzeitg. 37: 606. 1922.—Oak, hornbeam, pine, larch, silver fir, and Douglas fir showed little ill effects. Beech and spruce were seriously injured, putting out but little foliage in 1922 and many trees dying.—W. N. Sparhawk.

3937. SCH. *Die Nonnenkalamität*. [The nun-moth calamity.] Deutsch. Forstzeitg. 37: 752. 1922.—Beginning in 1919, Central European spruce forests have suffered greatly. In Czechoslovakia 7,000 hectares of spruce have been killed, on 10,800 hectares over 50 per cent of the trees were killed, on 20,000 hectares 25-50 per cent, and on 45,000 hectares less than 25 per cent. The infestation has spread into Bavaria, Saxony, and Silesia, and is still advancing.—W. N. Sparhawk.

3938. SCH. *Ungarns Forstpolitik*. [Forest policy of Hungary.] Deutsch. Forstzeitg. 37: 991. 1922.—The Hungarian government has submitted 6 forestry laws to the National Assembly: (1) creating a special fund to promote forestry, afforestation, and technical literature; (2) empowering certain credit institutions to lend money on forest properties; (3) creating a forestry bureau; (4) organizing the forest administration under the department of agriculture; (5) promoting increased production and afforestation; (6) encouraging associations of forest workers.—W. N. Sparhawk.

3939. SCH. *Verstaatlichung des grossen Privatwaldbesitzes in der Tschechoslowakei*. [State expropriation of private forests in Czechoslovakia.] Deutsch. Forstzeitg. 37: 606. 1922.—The Czechoslovakian government takes over, on Jan. 1, 1923, the approximately 300,000 hectares of private forests in the mountain districts near the boundaries, paying the owners pre-war values. This measure is adopted to put an end to trade between Germany and the German forest owners in Czechoslovakia, to increase the state resources, and to give the state control of a zone along its borders.—W. N. Sparhawk.

3940. SCHMIDT, ANDR. *Die Seekiefer (Sternkiefer, Igelföhre)*. [The maritime pine.] Forstwiss. Centralbl. 44: 265-269. 1922.—After the failure of attempts to grow *P. maritima* or *P. pinaster* in the Palatinate some 65 years ago, foresters generally agreed that the species was not suited to that part of Germany because of its susceptibility to frost. Many surviving

plantations indicate that not only was this idea wrong, but that maritime pine on very poor soils is far superior to the native *Pinus silvestris*. Results of stem analyses of average trees of the 2 species grown in mixture show a volume per tree of from 4 to 17 times as great in the maritime pine. It is suggested that a frost-hardy strain may be developed by careful selection.—*W. N. Sparhawk*.

3941. SCHMIEDEBACH, O. *Die Tachymetrie in Walde*. [Tachometry in the forest.] Zeitschr. Forst.- u. Jagdw. 54: 110-111. 1922.—The 3 principal tachometric methods and their applicability are briefly discussed. The most suitable instrument will consist of a small, light theodolite, with a stadia telescope for measuring distance, a gradient circle, and an attachable compass.—*J. Roesser*.

3942. SCHNIDER. *Die Bodenbonitierung und Klassenbildung für die bayerische Grundsteuer und deren geschichtliche Entwicklung*. [Soil valuation and classification for purposes of the Bavarian land tax.] Forstwiss. Centralbl. 44: 175-184; 224-232. 1922.—In theory, land of all classes was to be taxed on the basis of its average net yield, reduced to common terms of money value. Because of the wide variation in costs, and the absence of reliable data on yields and costs over a period of years, such classification was not possible. Instead, assessments were based on relative gross yields, reduced to terms of $\frac{1}{2}$ bushels of rye. This method was applied to pasture and forest lands as well as to cultivated land.—*W. N. Sparhawk*.

3943. SCHUBERT. *Über die Schattenfestigkeit der Holzarten*. [Concerning the shade tolerance of trees.] Forstwiss. Centralbl. 44: 285-290. 1922.—Starting with Wagner's theory that differences in tolerance of trees are due to differences in ability to absorb and utilize light of the shorter wave lengths, and pointing out that the most tolerant species, beech and fir, occur on limestone soils, Schubert advances the theory that it is the fluorescence of calcium salts which increases the tolerance of trees on soils containing lime. The rays from the red part of the spectrum are most favorable to assimilation and plant growth, while the ultra-violet rays either do not favor growth or actually retard it. Crystals of several calcium compounds, such as calcite, dolomite, aragonite, apatite, and wollastonite, show red fluorescence, converting ultra-violet rays into red rays. If it is true, as suspected, that calcium oxalate crystals, which are abundant in the foliage and bark of trees, also have red fluorescence, this will explain the greater tolerance of trees on limestone soils, and also the more thrifty growth of trees as well as of other vegetation on such soils. Moreover, Stoklasa has shown that calcium is one of the constituents of chlorophyll. Schubert suggests the desirability investigating whether calcium oxalate exhibits red fluorescence, as calcium carbonates and phosphates are known to do.—*W. N. Sparhawk*.

3944. SCHÜPFER. *Wuchsleistungen von Pseudotsuga Douglasii*. [Growth of Douglas fir.] Forstwiss. Centralbl. 44: 205-214. 2 fig. 1922.—Results of measurements on permanent sample plots in Bavaria are given in detail; 36-year-old stands showed an enormous increment during the last 5-year period, amounting to 35.96 cubic m. per hectare per annum, single trees having a volume of over 1 cubic m. It is not known how satisfactory the wood will prove for general construction, as only small trees have been cut. Douglas fir is less wind-firm than native species. Its culture is recommended on limited areas protected from wind.—*W. N. Sparhawk*.

3945. SCHWAPPACH. *Das bayerische Gesetz über die Aufforstung landwirtschaftlichen Grundstücke, vom 22 December, 1921*. [Bavarian law of December 22, 1921, regarding afforestation of agricultural land.] Deutsch. Forstzeitg. 37: 532-533. 1922.—Land used for agriculture may be devoted to timber growing only with permission of local officials. An owner may afforest small adjoining tracts without a permit, but must notify the proper authorities. Permits are granted only in cases where soil, climate, or location make the land better suited for forests than for agricultural crops, or if the forest is needed for a bird refuge or for protection of slopes or watercourses.—*W. N. Sparhawk*.

3946. SIEBER, PH. *Die Birke (Betula verrucosa)*. [The birch.] Forstwiss. Centralbl. 45: 12-18. 1923.—A plea is made for the greater appreciation of the birch as it reproduces abundantly, grows rapidly, and is useful in all sizes. It is especially well adapted to restock bare areas as a forerunner of more valuable species.—W. N. Sparhawk.

3947. STOATE, T. N. *Sylvicultural notes: Pinus insignis*. Australian Forest. Jour. 5: 102-104, 125-126. 1922.—Insect pests of the nursery and plantations, and utilization are discussed.—C. F. Korstian.

3948. VAILE, E. EARLE. *Some experiments in afforestation on the Waiotapu-taupo-plains*. New Zealand Jour. Agric. 25: 359-363. 1922.—More than 40 species have been planted. For timber purposes *Pinus insignis*, *Eucalyptus Macarthurii*, *E. viminalis*, *E. Gunnii*, *E. acervula*, and *Pseudotsuga Douglasii* are recommended. Natural afforestation is taking place wherever there is opportunity. Forest fires are a serious menace.—N. J. Giddings.

3949. WEISS, L. *Heinrich Zschokkes Einfluss auf die französischen Ödlandaufforstungen*. [Zschokke's influence on the reforestation of waste lands in France.] Forstwiss. Centralbl. 44: 455-462. 1922.—The early history of the reclamation is discussed briefly. The methods and species (maritime pine) finally used were those recommended by Zschokke.—W. N. Sparhawk.

3950. WHITE, C. T. *Botanical notes on Queensland forests*. Australian Forest. Jour. 5: 147-149. 1922.—A note is presented on the forest conditions of the Russell River and Bellenden-Ker Ranges, northeastern Queensland, together with a list of the important trees grouped by families.—C. F. Korstian.

3951. WILSON, ROBERT, and F. E. COFF. *Development of cooperative shelter-belt demonstrations on the northern great plains*. U. S. Dept. Agric. Bull. 1113. 27 p., 15 fig. 1923.—Objects of this cooperation are to stimulate interest in the improvement of farm homes by planting belts of trees about farm buildings in the northern Great Plains region, and to demonstrate by actual trial the species of trees best adapted to the different sections of this region. Results are based on 1,234 cooperation demonstrations (nearly 1½ million trees) over a 5-year period, of which 716 plantings are still growing. Box-elder, green ash, white elm, and caragana were most extensively tested and seem best adapted to the climatic conditions generally prevailing. Northwest poplar, chokecherry, buffalo berry, Russian olive, Black Hills spruce, white spruce, blue spruce, Scotch pine, and jack pine, less extensively tested, give promise of being suitable for general planting. Norway poplar, Carolina poplar, Russian golden willow, and laural leaf willow are not adapted to general planting. Methods of planting, cultivating, pruning, and precautions against animal and insect damage are discussed. A standard spacing distance has not yet been determined. Box-elder, green ash, and white elm were much more hardy when stock was raised from seed gathered from native trees than the more southern and eastern strains. Evidence is conclusive that it is possible to start successfully a planting of trees on the average upland farm site in this region, and future results will show whether or not these plantings will maintain themselves after attaining their maximum growth.—J. T. Buchholz.

3952. WIMMER. *Der Bestandsbegriff in seiner Bedeutung für Theorie und Praxis des Waldbaues*. [Significance of the "stand" concept in silvicultural theory and practice.] Forstwiss. Centralbl. 44: 371-380. 1922.—This is largely a discussion of the characteristics of various silvicultural systems. The writer concludes that theory and practice of silviculture and also of forest regulation must be based, not on the individual tree or the whole forest, but on the stand.—W. N. Sparhawk.

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 3726, 3738, 3743, 3745, 3750, 3758, 3780, 3782, 3792, 3813, 3830, 3924, 4052, 4056, 4063, 4072, 4075, 4092, 4109, 4116, 4136, 4139, 4260, 4274, 4299, 4560, 4574, 4575, 4603, 4674)

3953. ANONYMOUS. [German rev. of: WALDRON, L. R. The inheritance of rust resistance in a family derived from a cross between durum and common wheat. North Dakota Agric. Exp. Sta. Bull. 147. 24 p., 2 fig. 1921 (see Bot. Absts. 9, Entry 279).] Zeitschr. Pflanzenzücht. 8: 443-444. 1922.

3954. ANONYMOUS. [German rev. of: WITTE, H. Einige Beobachtungen über die Samenfarben des Rotklee und ihre Erbllichkeit. (Observations on the seed colors of red clovers and their inheritance.) Sveriges Utsädesför. Tidskr. 30: 257-265. 1920.] Zeitschr. Pflanzenzücht. 8: 444. 1922.

3955. ANONYMOUS. [German rev. of: WITTE, H. Luzernförädling. (Alfalfa investigations.) Sveriges Utsädesför. Tidskr. 31: 165-200. 1921.] Zeitschr. Pflanzenzücht. 8: 445. 1922.

3956. ALLEN, C. L. Effect of the age of sire and dam on the quality of offspring in dairy cows. Jour. Heredity 13: 167-176. 6 fig. 1922.—This study of the production records of Holstein-Friesian cows shows that there is no significant difference between the average age of the parentage of groups of high producing and comparatively low producing cows respectively; in fact, the dams of the high producers are on the average the younger. Some of the very highest producers were born from very immature parents.—Bulls as a rule are kept less than 4 years, and if they produce better daughters when aged, it is usually due to the fact that they are bred to better cows. This does not detract from the fact that the proven sire is much more desirable than the untried one.—The young from very immature or very old parents are as valuable as any. A 1st calf or a calf born in waning years is as valuable as a calf born in the prime of life.—Cows were found to reach their highest productive capacity on the average at about 6 years of age.—R. C. Cook.

3957. ALLEN, W. H. Selection of breeders without the trap nest. New Jersey Agric. Exp. Sta. Hints to Poultrymen 11: 1-4. 1922.—October is considered the best time to select breeding hens without the use of trap nests. Selection may be based largely on physical characteristics such as weight, body capacity, health, and quality. The past production of the hen may be judged largely by the pigmentation of the vent, ear lobes, beak, and shanks. The time of molting is also considered and late molting is a very desirable trait. The progeny test is recommended as a basis for selecting breeding males. Pedigreed males may be purchased from other breeders to be used in flocks not trap nested.—F. A. Hays.

3958. ALVERDES, F. [German rev. of: PLATE, L. Allgemeine Zoologie und Abstammungslehre. [General zoology and genetics.] vi + 629 p., 557 fig. Gustav Fischer: Jena, 1922.] Zeitschr. Indukt. Abstamm.- u. Vererb. 30: 138-139. 1922.

3959. ARISZ, W. H. Selectie van Hevea. [Selection in Hevea.] Arch. Rubbercult. 5: 475-485. 1921.—The author considers it unnecessary to isolate pure lines of *Hevea brasiliensis* and advocates the use of F₁ hybrids. Vegetative reproduction as a means of improvement is discussed.—C. D. LaRue.

3960. BEMMELN, J. F., VAN. Wing-design of mimetic butterflies. Proc. Roy. Acad. Amsterdam 23: 877-886. 1922.—Mimetic resemblances do not come under one general law; each must be explained individually. Real mimicry is rare and of chance origin. Excluding from consideration possible usefulness of mimetic forms and studying them from a purely morphological standpoint, mimetic patterns do not differ essentially from non-mimetic. The

author tries "to reconstruct the original common genus or family type" by comparative studies, judging by the markings of both mimetic and non-mimetic members of the group. "All the elements which enter into the composition of the pattern of mimetic forms can be traced back to those of their non-mimetic congeners," and are characteristic of the group as a whole.—The aberrant slender wings of mimetic Dismorphias, though unlike the common type in butterflies, are probably primitive, cf. Sphingids, Hepialids, as well as Trichoptera, Neuroptera, Odonata. Mimic and model simply retain the ancient form. Their spotted pattern likewise may be more primitive than the white or yellow self colors of common Pierids.—Analysis of the case of *Papilio dardanus* shows that its several different mimetic females are more primitive in coloration and form of wings than the male type. Wing tails and suffusion of the wing with yellow, characteristic of the male, are relatively recent acquisitions. Taillessness and extension of black markings, characteristic of the mimetic females, are primitive. Several "non-mimetic" female varieties resemble these females more than they do the male.—Since every detail in the pattern of mimetic forms is one of the hereditary features of the group (genus, family, or order), "there is no reason left for ascribing the total effect of the combination of all these details to the influence of protective mimicry" through natural selection. "Polymorphic females may profit by their accidental likeness to unpalatable forms, * * but this profit can merely be a consequence of a casual similarity, never its cause.—J. H. Gerould.

3961. BLARINGHEM, L. Sur l'hérédité du sexe chez la *Lychnide dioïque* (*Lychnis vespertina* Sibthorp). [The inheritance of sex in dioecious *Lychnids*.] *Compt. Rend. Acad. Sci. Paris* 174: 1429-1431. 1922.—*Lychnis vespertina* crossed by *L. sylvestre*, *L. rubrum*, and *L. vespertina* gave 99, 96, and 95 per cent pistillate plants respectively. Rose colored and white flowered plants of the 1st cross, back-crossed by the same plants used as seed parent, gave a total of 423 pistillate and 472 staminate plants. The progenies of individual plants varied from 31 to 66 per cent of pistillate plants with no relation between flower color and sex.—D. F. Jones.

3962. BLUHM, AGNES. [German rev. of: HARRISON, J. W. H. A preliminary study of the effects of administering ethyl alcohol to the lepidopterous insect *Selinia bilunaria* with particular reference to the offspring. *Jour. Genetics* 9: 39-52. 1919.] *Arch. Rass.- u. Ges. Biol.* 14: 356-357. 1922.

3963. CLARK, A. H. Animal evolution. *Proc. Nation. Acad. Sci. [U. S. A.]* 8: 219-225. 1922.—The radially symmetrical colonial coelenterates represent the highest degree of purely biological perfection, and all other animals (except the sponges) are derived from them through the appearance of various defects which had the anomalous result of leading to increased bodily efficiency.—D. F. Jones.

3964. CLAUSEN, ROY E. Inheritance in *Drosophila hydei*. I. White and vermilion eye-colors. *Amer. Nat.* 57: 52-58. 1923.—Two sex linked mutants—white and vermilion—have been isolated in *Drosophila hydei* which appear to be parallel with the similar mutants in *D. melanogaster* and in *D. obscura*. The percentage of crossing over between them is 9.3 as compared with 30.5 in *D. melanogaster* and 8.0 in *D. obscura*. With the mutants described by Hyde, 2 of the 6 linkage groups expected, because of the 6 pairs of chromosomes in *D. hydei*, are thus known. Non-disjunction appeared in the case of 1 male, which was completely sterile. It was probably an XO male, which is sterile in *D. melanogaster*.—H. H. Plough

3965. COLE, LEON J. Chanticler poultry. *Jour. Heredity* 13: 147-152. 3 fig. 1922.—At the Institute Agricole d'Oka, Province of Quebec, Canada, the poultry husbandman, Brother Wilfred, a Trappist monk, undertook the "creation" of a purely Canadian breed of poultry. "Fancy" characters were to be eliminated and the breed was to be a general purpose one. The color decided on was white, and the plumage was to be heavy enough to offer maximum protection during the Canadian winter, and the comb and wattles were to be

reduced to a minimum to reduce the chances of freezing. In making his new breed he used the obvious method of mixing together the available ingredients and "sifting out the desired ones with the sieve of selection." He made his first crosses in 1908, a dark Cornish being bred to white Leghorn hens and a Rhode Island red to white Wyandottes. In succeeding years various crosses were made, with selection toward the desired type. By 1920 the uniformity of the breed had become such that it was recognized by the American Poultry Association and admitted to a place in the "standard of Perfection."—*R. C. Cook.*

3966. CZUBER, E. Zur Frage der Anwendbarkeit der Wahrscheinlichkeitsrechnung auf landwirtschaftliche Versuche. [The question of the application of the theory of probabilities to agricultural investigations.] Zeitschr. Pflanzenzücht. 8: 331-339. 1922.—The author discusses the application of simple biometric methods, the arithmetical mean, standard deviation, standard deviation of mean, and standard deviation of the difference of means, in agricultural data. He criticizes the use of certain more complex methods of analysis.—*Sewall Wright.*

3967. DANIEL, LUCIEN. Hyperbioses de Soleil et de Topinambour. [Hyperbiose grafts of *Helianthus annuus* on *Helianthus tuberosus*.] Compt. Rend. Acad. Sci. Paris 175: 984-985. 1922.—A scion of sunflower is grafted upon a stock of *Helianthus tuberosus*. Later a scion of *H. tuberosus* is grafted upon this scion of sunflower. *H. tuberosus* is referred to as the hypobiont and the hyperbiont and sunflower is the mesobiont. The hyperbionts differ in vigor and branching, and resist very unequally the environmental conditions. Tuberization of the hypobiont is more intense than in ordinary grafts, i.e., olobiosis of *H. annuus* on *H. tuberosus*, but the crop is not so large. It did not exceed 400 gm., whereas in olobiosis it is 700 gm., in olohyperbiosis 2,050 gm., and in hemihyperbiosis 800-975 gm. A study is also made of the distribution of inulin in these grafts. None is found in the *H. annuus* as a mesobiont.—*C. H. Farr.*

3968. DAVIS, B. M. An attempt to improve through selection the style length and fertility of *Oenothera brevistylis*. Genetics 7: 590-596. 1922.—For 5 generations of *Oenothera brevistylis*, a short-styled mutation of *O. Lamarckiana*, selection toward increased length of style was practised, those plants being chosen as parents which produced the highest percentage of flowers with increased style length, except when sterility (a high degree of which is correlated with the short style of *O. brevistylis*) prevented such procedure. Selection failed to hold the gains made by individual plants; though the short style is inherited, the variations back toward normal style length are apparently not due to inherited factors.—*Frieda Cobb Blanchard.*

3969. DUBLIN, LOUIS I. The higher education of women and race betterment. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. p. 374-385. Williams & Wilkins Co.: Baltimore, 1923.—The higher education of women should be a powerful influence for race betterment; practically, it has not worked that way. It is a common criticism of women's colleges that they educate students away from normal home interests and, in place of these, develop other interests which are, in a sense, antagonistic. A relatively small proportion of college women marry and, when married, bear but few children. For this disgenic tendency the kind of education women receive is largely responsible. It is pointed out also that college women are very often unprepared to assume their obligations in the community effort for social betterment. They are not always aware of the importance of the social movements which promise so much in the solution of community problems. To meet this situation the writer recommends a change in the curriculum of women's colleges. He has emphasized a programme of scientific construction covering the entire 4-year period, of which the central theme is the biological sciences, with especial reference to personal and community hygiene. The courses follow one another beginning with those in physics and chemistry and general biology, through physiology and hygiene, community hygiene, as included under such headings as, bacteriology, sanitation, vital statistics, and the administration of

public health departments. It is one of the advantages of this plan that it has unity; that it covers a field of study that has the greatest possible bearing on the immediate needs of the students themselves; that it gives added opportunities for cooperation to most of the departments of the college; that it makes all departments conscious of the part they are to play in a larger programme; and that it ties up the college activities to those in the community along lines considered of the greatest importance in modern life. The author has had in mind, throughout, the development of such interest on the part of the students as will attract them to the activities of home life as a personal ideal. It will develop a confidence to participate in the constructive community activities. Special emphasis is placed upon such work as public health, especially as it affects schools, care of mothers and children, and the Americanization of the foreign born. It is assumed that the young college woman who has had the advantages of such courses as are outlined will be ready to serve these movements with technical direction and, in any case, with sympathy and understanding.—*Louis I. Dublin.*

3970. EAST, E. M. As genetics comes of age. *Jour. Heredity* 13: 207-214. 1922.—The author reviews what has been done in genetics since the rediscovery of Mendel's data in 1901. This is compared with the beliefs prevailing since ancient times regarding the inheritance of characters. The article presents no new facts but summarizes the work that has been done in genetics since that science began.—*R. C. Cook.*

3971. EAST, E. M. Population in relation to agriculture. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. p. 215-232. Williams & Wilkins Co.: Baltimore, 1923.—The author discusses phases of the problem of assuring an adequate future food supply for the growing population of the world, presenting estimates of the world population, rate of increase, total land area, arable land area, and area now being farmed, and discussing the possibility of increase in production per acre, the possibility of discovering new foods, the problems of soil fertility, and problems of an agricultural policy. But even with solution for all these difficult problems, "no matter how great the heights of human genius in providing for future generations the present rate of population increase cannot continue indefinitely."—*Sylvia L. Parker.*

3972. ENRIQUES, PAOLO. Hologynic heredity. *Genetics* 7: 583-589. 2 fig. 1922.—The name diagnic heredity is proposed for the typical sex-linkage of the XX-XY type and diandric heredity for the WZ-ZZ type. Hologynic heredity is proposed for a new type of inheritance where transmission is direct from mother to daughter, the sons not being affected. Pedigrees showing the hologynic inheritance of hemophilia and cataract of the eye are given. A case of holoandric heredity is cited, transmission being from father to son, the daughters not being affected. An explanation is offered which makes use of selective fertilization.—*J. L. Collins.*

3973. FETSCHER, R. Ein Stammbaum mit Spalthand. [A "cleft-hand" pedigree.] *Arch. Rass.- u. Ges.-Biol.* 14: 176-177. 1922.—A mentally normal boy with bilateral "cleft-hand" has 1 epileptic and 3 normal sibs; parents, uncles, and aunts are all normal. The paternal grandfather, however, showed evidence of mental aberration and 1 of his nephews has "cleft-hand." The author is inclined to ascribe these physical and mental anomalies to the same cause, possibly a recessive Mendelian factor.—*C. H. Danforth.*

3974. FETSCHER, R. Über die Erbllichkeit des angeborenen Klumpfusses. [On the heredity of congenital club foot.] *Arch. Rass.- u. Ges. Biol.* 14: 140-158. 1922.—Club foot is hereditary in $\frac{1}{2}$ - $\frac{3}{4}$ of all cases and depends primarily on nervous causes. Families in which the trait appears show a somewhat increased number of bodily defects and a greatly increased frequency of mental disturbances; infant mortality is high.—*C. H. Danforth.*

3975. GOODALE, H. D., and RUBY SANBORN. Changes in egg production in the Station flock. *Massachusetts Agric. Exp. Sta. Bull.* 211. 99-125. 16 fig. 1922.—Results of 8 years'

work in breeding Rhode Island Red poultry for egg production are reported. The working hypothesis assumes that 5 main characteristics are concerned in annual egg production. These characteristics are called maturity, rate, broodiness, persistency, and winter pause. The age at 1st egg has been reduced to an average of below 200 days. Some families have been developed that are practically free from broodiness. Progress has also been made in eliminating the winter pause and also in increasing the percentage of birds showing high rate. Special attention has not been given to persistency. Standards for selection became more rigid as the work progressed. Particular attention was paid to the size of the family in selecting both male and female breeders. The average winter egg production has advanced from 36.70 to 67.3 eggs; the average annual egg yield, from 145.41 to 200.98 eggs at the close of 1921.—*F. A. Hays.*

3976. GOWEN, MARIE S., and JOHN W. GOWEN. Complete linkage in *Drosophila melanogaster*. *Amer. Nat.* 56: 286-288. 1922.—In 1917 a stock appeared which showed no crossing over in the sex chromosome. This has been continued to date, and shows complete linkage, i.e., absence of crossing over in the 2nd and 3rd chromosomes as well. The condition is stated to be genetic, and the gene is believed to be recessive, located in the dichaete-hairless region of the 3rd chromosome. The females in this stock thus show the same complete linkage which is the rule for males.—*H. H. Plough.*

3977. GRIFFEE, F. Breeding oats resistant to stem rust. *Jour. Heredity* 13: 187-190. 3 fig. 1922.—The method used for differentiating heterozygous and homozygous F_2 plants in breeding for rust resistance, when resistance is a dominant character, is to grow in the greenhouse F_3 seedling families from each resistant F_2 plant. These seedlings are inoculated with rust and from their reaction the F_2 plants which are homozygous for resistance are determined. In breeding oats resistant to stem rust, 192 of the 567 F_3 seedling families tested bred true for resistance.—*Fred Griffie.*

3978. HEINRICHER, E. Kreuzungsversuche zwischen *Viscum album* L. und *V. cruciatum* Sieb. [Crossing experiments between *Viscum album* and *V. cruciatum*.] *Ber. Deutsch. Bot. Ges.* 40: 174-177. 1922.—*Viscum cruciatum* pollinated with *V. album* did not set fruit while the reciprocal cross yielded some fruits, which resembled those of *V. album* but which the author suggests may be the result of close pollination by pollen from staminate plants of *V. album* in the same vicinity. Von Tubeuf's statement that these 2 species of *Viscum* hybridize could not be verified. The results of the author's experiments with mistletoes lead him to conclude that anemophily is more general than entomophily.—*W. C. Muenscher.*

3979. HERIBERT-NILSSON, N. Experimentelle Studien über Variabilität, Spaltung, Artbildung und Evolution in der Gattung *Salix*. [Experimental studies in variability, splitting, species formation, and evolution in the genus *Salix*.] *Lunds. Univ. Arsskr.* 14: 145 p., 65 fig. 1918.—The author approached the problem of splitting in hybrids in the genus *Salix* because Wichura's results were not clear. He grew a large 2nd generation of hybrid *S. viminalis* × *S. caprea*. General habit of growth showed variations in height, mechanical structure and branching; some plants were intermediate, some like one parent, and some like the other. Some leaves were noticeably larger and some smaller than those of the parents and F_1 ; the shape was intermediate in various degrees. All degrees of intermediacy were shown in regard to color, glossiness, and hairiness, and a greater range of variability than appeared in the parents. Of 150 specimens, 70 per cent were apparently like F_1 . The remainder belonged in 1 of 3 types: (1) resembling one species in some respects and the other in others; (2) resembling one of the parents decidedly; (3) differing decidedly from both parents. Mendelian splitting occurs in connection with leaf form, involving not more than 4 hereditary factors. Length of leaf and width split independently. More individuals are like *S. caprea* in leaf width than like *S. viminalis*, indicating more factors for width than for length. *S. caprea* has 2 polymere (polymere) factors for leaf width, *S. viminalis*, 1 for leaf length. These factors also influence

leaf color, height of shrub, and periodicity. This is considered proof that the most fundamental species-characters Mendelize. Back-cross (*S. viminalis* \times *S. caprea*) \times *S. viminalis* confirmed the author's assumption of the factorial constitution of the species. Hairiness splits in a more complicated way than fundamental habit characters. Pubescence of stamens, form of catkin and time of blossoming, resistance to *Melampsora* and winter killing are characters governed by other factors. *S. viminalis* \times *S. daphnoides* shows splitting and segregation of the most fundamental physiological and morphological characters. The species difference is genotypically simpler than between *S. viminalis* and *S. caprea*. Numerous back-crosses confirm the assumption made in accordance with the Mendelian theory that range of variability of a back-cross can lie only between the F_1 and the back-cross parent, that the majority are intermediate and thus phenotypically resemble the parent. Primary hybrids were obtained where the number of individuals was not too small. Crosses between the hybrid and the 3rd species result variously, depending on the factorial constitution; all are variable. (*S. cinerea* \times *S. purpurea*) \times *S. caprea* and *S. aurita* \times (*S. repens* \times *S. viminalis*) showed less variability than F_2 . (*S. viminalis* \times *S. caprea*) \times *S. cinerea*, and (*S. viminalis* \times *S. caprea*) \times *S. aurita* showed as much variability as F_2 . Crosses between 2 hybrids show greater variability than F_1 cross and if 1 parent is common to both hybrids, it will reappear in the progeny of the hybrid cross. Crosses between complicated hybrid combinations show the greatest resemblance to the species last used in the combination. The author secured 2 combinations in which there were 6 species; Wichura had 1 in which there were 7. Sterility does not increase with degree of complication. The usual 1:1 ratio of sexes was greatly modified in some crosses. Mosaic forms were found at times. Many cases were encountered in which great phenotypic variability in hybrid progeny could be traced back to an unexpectedly simple factorial system. Difference between species and variety characters is morphological, not genotypical, hence reduced to a question of nomenclature. What seem like new species are often but the expression of a new combination of factors. Genotype formation through crossing is the cause of variability. Varieties of species must be as old as species, not developed from them, as Darwin thought. Species of systematists arise in distinct morphological entities resulting from combinations of splitting factors of 2 species. Formation of new genes has not been established experimentally. Loss of genes is questionable; an evolutionary theory built on the idea of mutants arising through loss of genes would be untenable.—*Helen D. Hill.*

3980. HILDÉN, KAARLO. Über die Form des Ohrläppchens beim Menschen und ihre Abhängigkeit von Erbanlagen. [On the form of the ear lobes in man and their relation to heredity.] *Hereditas* 3: 351-357. 1922.—Except for the aged, the ill, and the newborn, all the inhabitants of Runo, an isolated island, were examined as to the form of ear lobes. Two categories are recognized, the free and the adherent. Of the former, there were 168 cases; of the latter, 89. While there was occasional difficulty in diagnosis, the author, unlike Carrier, found no exception to the rule that the free type of ear lobe behaves as a simple dominant trait, the adherent form being recessive.—*C. H. Danforth.*

3981. HOFFMAN, F. L. Race amalgamation in Hawaii. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. p. 90-108. Williams & Wilkins Co.: Baltimore, 1923.—A study is reported of 22,388 death certificates of decedents in the Territory of Hawaii, 1910-1915, with especial reference to the correlation of father's birthplace and mother's birthplace with birthplace of the subject. Racial affinities of parents were inferred from their place of birth. The summarized data are given from which the following may be emphasized: (1) Of 20,631 mothers, 7,442 were born in Hawaii, 7,269 in Japan, 1,597 in Portugal, 1,358 in China; and the remaining 14.4 per cent in the Philippines, Porto Rico, Spain, U. S. A., Korea, Germany, and elsewhere, in the order named. (2) The percentage of subjects of whose parents both were born in same country was Chinese 78.3, English 48.6, Hawaiians 98.2, Japanese 99, Filipinos 97.5, Portuguese 85.8, Americans 66.8. It is concluded that "racial intermixture in the Hawaiian Islands is much more restricted than is generally assumed;" that the greatest amount of intermixture is between native Hawaiian women and foreign men, chiefly Chinese,

English, and German. The Japanese, although the second largest racial element in the data, were involved in practically none of the mixed marriages.—*L. C. Dunn.*

3982. HOFFMAN, F. L. The problem of negro-white intermixture and intermarriage. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. *p.* 175-188. Williams & Wilkins Co.: Baltimore, 1923.—Race intermixture between blacks and whites in the U. S. A. is found to be on the increase. The ratio of mulattoes to the total colored population increased from 11.2 per cent in 1890 to 20.9 per cent in 1910. The ratio and rate of increase of mixed bloods is greatest in the west, least in the south. Data on 8 cases of mixed marriages in St. Paul and Minneapolis are given from which it is concluded that "the whitewomen who have married blacks are of the weaker class either mentally, morally or physically; while conversely the negro men represent the better class in most respects, at least physically and mentally." After some discussion the author condemns all such mixed marriages as disgenic and anti-social.—*L. C. Dunn.*

3983. HOOTON, E. A. Observations and queries as to the effect of race mixture on certain physical characteristics. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. *p.* 64-74. Williams & Wilkins Co.: Baltimore, 1923.—This paper presents a physical anthropologist's impressions concerning the use of non-mensurable morphological details as criteria of race or mixture, with remarks on the possibility of analyzing modern races by the study of racial hybrids. Among the specific details considered are: (1) the peculiarly compact bony texture and yellow brown patina characteristic of negroid skulls which appears in the skulls of hybrids between negroids and races lacking this peculiarity; (2) the complex coronal suture of European races which appears to be dominant in crosses with races characterized by simpler sutures; (3) the low broad nasal bridge of negroids and mongloids which considerable evidence indicates is recessive to the leptorrhine (European) type; (4) head form. Mesocephalic races are interpreted generally as hybrid types often showing disharmonic dolicho and brachy features, suggesting separate inheritance of the cranial parts. Conclusions are given from unpublished data on the inheritance of hair form and color, skin pigmentation, etc., in negro-white crosses illustrating the author's thesis that the physical results of racial crosses may be interpreted as due to the inheritance of numerous small units, presumably Mendelian, from each parent race.—*L. C. Dunn.*

3984. IZQUIERDO, J. JOAQUIN. Breve resena genealogica de la familia Izquierdo. [The genealogy of the Izquierdo family.] 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. *p.* 348-373. Williams & Wilkins Co.: Baltimore, 1923.

3985. JACK, H. W. Brothers in Rugby football. Jour. Heredity 13: 161-162. 1922.—This paper affords additional evidence of the hereditary nature of athletic traits in families. Twenty-three sets of 2 or more brothers are considered from the point of view of their ability to play the British game, as judged by expert selection committees; that brothers inherit similar qualities is clearly evident.—*H. W. Jack.*

3986. JENKIN, T. J. Notes on vivipary in *Festuca ovina*. Rept. Bot. Soc. and Exchange Club British Isles 6: 418-431. 1 *pl.* 1921 [1922].—Vivipary is shown to be to some extent hereditary and by such seeds as the plant is able to produce.—*G. C. Druce.*

3987. JONES, E. E. The genetic significance of intra-uterine sex ratios and degenerating fetuses in the cat. Jour. Heredity 13: 237-239. 1922.—To test Doncaster's hypothesis that occurrence of tortoise shell males in cats and their usual sterility might be due to hormone action as in free-martins in cattle, uteri of pregnant cats were examined. No trace of anastomosis of circulatory systems supplying fetuses was found. Intra-uterine sex ratio in cats was found to be 122.10 ± 8.30 . White coat color in cats was thought to have similar action to that found by Little in mice; the hypothesis was tested by comparison of litter size. Mean litter size of white females was 4.08 ± 0.13 , that of non-whites 4.48 ± 0.07 , the difference being

0.39 ± 0.15 , which is 2.71 times the probable error. Records of degenerating embryos show that out of 102 fetuses of white cats, 11, or 10.78 ± 2.07 per cent were degenerating. In non-white females out of 551 fetuses, 25, or 4.54 ± 0.60 per cent were degenerating. The difference is 6.25 ± 2.16 , which is 2.89 times the probable error. Recalculation of non-white figures excluding 1 litter considered pathological, shows 21 degenerating out of 547 fetuses, a percentage of 3.84 ± 0.58 . The difference between white and non-white then becomes 6.845 ± 2.149 , which is 3.2 times the probable error. The author believes that the conclusion is probably warranted that a significantly greater number of degenerating fetuses is found in white than in non-white cats; also that in some white cats, at least, a lethal action of some sort is operative when the factor for white is present even in a simplex condition.—E. E. Jones.

3988. KAHN, EUGEN. [German rev. of: ENTRES, JOSEPH LOTHAR. *Zur Klinik und Vererbung der Huntingtonschen Chorea*. (On the clinics and heredity of Huntington's chorea.) 149 p. Julius Springer: Berlin, 1921.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 219. 1922.

3989. KAHN, EUGEN. [German rev. of: HOFFMAN, HERMANN. *Die Nachkommenschaft bei endogenen Psychosen*. Genealogischcharakterologische Untersuchungen. (Studien über Vererbung geistiger Störungen.) (The offspring in endogenous psychoses. Genealogical character studies. (Studies on the inheritance of mental disturbances.) Monogr. Gesam. Neurol. u. Psychiatrie 26. 233 p. Julius Springer: Berlin, 1921.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 144. 1922.

3990. KAHN, EUGEN. [German rev. of: KRETSCHMER, E. *Körperbau und Charakter*. Untersuchungen zum Konstitutionsproblem und zur Lehre von den Temperamenten. (Body-build and character. Investigations of the constitution problem and temperament.) 2nd ed., 195 p., 32 fig. Julius Springer: Berlin, 1922.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 30: 139-144. 1922.

3991. KEY, WILHELMINE E. *Heritable factors in human fitness and their social control*. 1. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, Genetics, and the Family. p. 405-412. Williams & Wilkins Co.: Baltimore, 1923.—Since many refinements of method in education and philanthropy tend to encourage the survival of the inherently unfit, the question of a nation's continuing integrity resolves into a nice balance between certain genetic and social forces inherent in the blood lines of its people. Intensive study of family networks shows widely different potentiality of their various lines. Slight differences in planfulness and perseverance in 2 brothers, for example, have been found to initiate a divergence which in a few generations served to place the 2 branches founded by these brothers at opposite extremes of the social scale. Studies of the quantitative variation in such traits and of the ability with number, point to a segregation of factors to produce on the one hand accentuation and on the other progressive degeneration with regard to these traits, according to the types of mating made. The degenerating lines show frequently a very high birthrate; this, together with their tendency to draw to themselves the defective members of other mixed strains, results in centers of degeneracy and defect. This situation emphasizes as one of the chief duties of institutions, a detailed study of the families from which their charges come, with a view of allowing their genetic potentialities due weight in deciding the fate of their cases, and calling for additional state aid in the treatment of the centers of degeneracy and defect as fast as they are uncovered. The abilities known as the aptitudes have also been found to follow blood lines. The personalites, that have led in industry, science, art, and political organization have arisen by a fortunate crossing of able lines. Hitherto this process, at least under the social conditions pertaining in the U.S.A., has seemed to take care of itself. There are however grave indications of change. The dying out of many highly gifted lines, the low fecundity of others are among the signs of this change. The salient social and economic factors involved in the situation are gradually being evaluated. In addition to the means already touched on for correcting the anti-eugenic influences are the following: (1) a return to saner

and simpler standards of living which would make possible the rearing of larger families in middle classes; (2) a campaign of education calculated to foster "the eugenic conscience" among all classes; (3) the encouragement on the part of the numerous foundations, not of celibacy and comparative sterility in their members, but of marrying and rearing families; (4) the concept of service in contrast to that of personal aggrandizement; (5) early and more adequate economic adjustment to render possible early marriage and parenthood; (6) psychological tests supplemented by family history studies to determine the trend of mental and emotional development. These are especially indicated where the child shows delinquent tendencies or bids fair to become unusually brilliant.—*Wilhelmine E. Key.*

3992. LADEBECK, ERNST. *Die Farben einiger Hühnerrassen.* [The pigmentation of races of poultry.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 30: 1-62. 38 fig. 1922.—A study of color in the following races of poultry is reported: *Gallus bankiva*, Partridge-feathered Italian, Red Sussex, Rhode Island Red, Speckled Sussex, Crollivitz, Barred Rock, and Minorca. The report is divided into 3 sections: (1) morphology of feathers and feather pigment; (2) chemical properties of feather pigments; (3) coloration of comb, earlobes, and shanks. Feather color is found to depend upon color and shape of pigment granules and their distribution. The chemical properties of the pigments are rather extensively reported upon. Yellow pigment of the shanks is classed as a lipochrome. An extensive list of references is given.—*F. A. Hays.*

3993. LANCEFIELD, REBECCA C., and CHARLES W. METZ. *The sex-linked group of mutant characters in Drosophila willistoni.* *Amer. Nat.* 56: 211-241. 1922.—Twenty-eight recessive sex-linked mutant characters are described, and the genetic behavior of this species is shown to be similar to that of *D. melanogaster*. At least 2 of these mutants—yellow and scute—are believed to be parallel mutations, while forked and stubby probably are also. When the genes of the sex chromosome of *D. willistoni* are plotted in a map on the basis of the percentages of crossing over, it appears that yellow and scute are near the middle, while forked and stubby are at one end at 12 and 42 units respectively. The map in *D. melanogaster* shows yellow and scute at one end of the chromosome, with singed and forked 21 and 56.5 units off. Since the X chromosome of *D. melanogaster* is rod-like and that of *D. willistoni* is V-shaped, these facts suggest the interesting conclusion that the X chromosome of the former corresponds to one end only of the same chromosome in the latter.—*H. Plough.*

3994. LA RUE, CARL D. *Correlation in structure between mother and daughter trees of Hevea.* *Arch. Rubbercult.* 5: 567-573. 1921.—Bark thickness and the number of rings of latex vessels were investigated in 1½-year old seedlings of which the female parents only were known. The thickness of bark in the seedlings varied from 0.5 to 3.0 mm., with an average of 1.28 mm. The coefficient of correlation between mother and daughter trees for bark thickness is 0.366 ± 0.106 . The number of latex-vessel rings in the seedlings varied from 2 to 11, with an average of 5.9. The table showing the correlation between mother and daughter trees for number of latex-vessel rings indicates that the coefficient of correlation is insignificant. Since the number of latex-vessel rings is one of the most important factors in yield, there is an indication that yield, also, may be little inherited from the mother tree where seed are produced by open pollination. Seed of which both parents are high producers are to be preferred for selection in spite of their increased cost.—*C. D. La Rue.*

3995. LÉCAILLON, A. *Sur les caractères d'un hybride issu de l'union d'un Canard musqué mâle (Cairina moschata Flem.) et d'une Oie d'Egypte femelle (Chenalopes aegypticus Eyt.).* [The characters of a hybrid resulting from the mating of a Canard Muscovy male duck (*Cairina moschata*) and an Egyptian female goose (*Chenalopes aegypticus* Eyt.)] *Compt. Rend. Acad. Sci. Paris* 174: 68-69. 1922.—The hybrid resulting from the accidental mating possessed upon hatching the yellow color and characteristic odor of the duck. The hybrid was a male and when adult was of large size and carried the body in the upright manner of a goose. It was mute as is the duck. Mating with a female goose which continued for 3 years

proved infertile. In its extended mating habit and its aggressiveness the hybrid was like a goose. The plumage color, in general, resembled dorsally, the duck, and ventrally, the goose; the white feathers of both species were lacking. The red skin and erectile feathers present on the head of the muscovy duck were absent, as were the brown feathers on the face, neck, and breast of the goose. This hybrid had taken characters from both parent species, but it cannot be considered a mosaic.—*H. W. Feldman*.

3996. LENZ-MUNCHEN. [German rev. of: FRETZ, G. P. *Heredity of headform in man*. 193 p., 16 pl., 9 fig. Martinus Nijhoff: The Hague, 1921.] *Zeitschr. Indukt. Abstamm.-u. Vererb.* 29: 214. 1922.

3997. LOTKA, ALFRED J. *The stability of the normal age distribution*. *Proc. Nation. Acad. Sci. [U. S. A.]* 8: 339-345. 2 fig. 1922.—Earlier papers by the author have established the fact of a unique age distribution which, in certain circumstances, has the property of perpetuating itself when once set up in a population. This paper offers proof that this age distribution is stable; that is, that a population will spontaneously revert to it after displacement therefrom or will converge to it from an arbitrary initial age distribution.—*Sylvia L. Parker*.

3998. LOTSY, J. P. *La botanique appliquée et l'hybridisme*. [Applied botany and hybridism.] *Rev. Bot. Appl.* 2: 313-325. 1922.—The principles of the chromosome theory of heredity are reviewed with mention of the difficulties in analyses caused by heterogamy and linkage. Hybrids are divided into 2 groups, those in which crossing-over occurs and those in which it does not occur. The behavior in *Drosophila* hybrids is given as typical of the first class. In the 2nd group there are 7 divisions as follows: duplex hybrids, Mendelian hybrids, nuclear chimeras, pseudohybrids, semi-duplex hybrids, pseudo-duplex hybrids, and triplex hybrids. This classification is based upon the behavior of the paternal and maternal haploid chromosomes. A species exemplifying each class is given. The cytological work of Täckholm on *Rosa* and of Belling on *Canna* is considered as evidence for the theory of the origin of species by the hybridization of existing species differing in specific chromosome number.—*J. L. Collins*.

3999. MACDOWELL, E. C. *The influence of alcohol on the fertility of white rats*. *Genetics* 7: 117-141. 7 fig. 1922.—The fertility of treated animals has been tested by comparisons with full brother-and-sister controls. The results indicate that heavy as well as light doses of alcohol tend to reduce the sizes of litters from treated rats and their descendants. Heavy doses reduce the number of litters produced by the treated rats and increase the number produced by their descendants. The 1st result is interpreted as due to a modification of the germ-plasm; while the 2nd is believed to support the hypothesis that the alcohol has raised the numbers of litters in the 2nd generation through the elimination of the litters in the first generation that bore the less fertile germinal material.—*Herman L. Ibsen*.

4000. MALLOCH, WALTER SCOTT. *An F₁ species cross between Hordeum vulgare and Hordeum murinum*. *Amer. Nat.* 55: 281-285. 1921.—This cross between common cultivated barley and *Hordeum murinum*, a wild barley, had a sheath with a greater circumference than the blade, thus fitting loosely around it. The blade of the 1st leaf was narrow, linear, and spirally twisted with slightly roughened edges. The blade was about $1\frac{1}{2}$ inch in width and the plant grew to a height of 4 inches; at this stage the plant died. There was no evidence of nodes. The 2 species differ in a large number of morphological characters. Probably the reaction systems of the 2 species fail to harmonize. There are all degrees of incompatibility of reaction systems in species crosses.—*Walter Scott Malloch*.

4001. MOHR, OTTO L. Ö. Winge's paper on "The interaction between two closely linked lethals in *Drosophila* as the cause of the apparent constancy of the mutant 'spread.'" A necessary rectification. *Genetics* 4: 457-461. 1922.—The stock which Winge assumed to be spread

and which he obtained from the author was not spread but dichæte. Spread differs from dichæte both morphologically and genetically. The genetic behavior of dichæte has been described by previous *Drosophila* workers, with whose accounts Winge's is in agreement. The lethal which Winge designates as vit was known to the author, in whose stock of dichæte it arose by mutation. A note by Winge explains how the mistake came to be made. [See Bot. Absts. 12, Entry 4024.]—*Alexander Weinstein.*

4002. MORGAN, T. H. On the mechanism of heredity. (Croonian lecture.) Proc. Roy. Soc. London, B 94: 162-197. 2 pl., 35 fig. 1922.—This paper constitutes a general survey of the *Drosophila* work showing the genes to be localized in the chromosomes. After reviewing the parallelism between chromosome behavior and the distribution of the genes according to Mendel's 1st and 2nd laws, the author cites Bridges' cases of non-disjunction of the 4th and of the sex chromosomes and Lillian V. Morgan's case of union of the 2 X chromosomes (resulting in 100 per cent non-disjunction) to show that specific characters have, even in abnormal cases, been found identical in distribution with specific chromosomes. He next reviews the parallelism between the cytologically determined constellation of chromosomes and the genetic "maps" of linkage-groups, as found by various workers, first in *Drosophila melanogaster*, and later in *D. simulans*, *D. willistoni*, *D. virilis*, *D. obscura*, the edible pea, and *Clarkia*. The idea of crossing over in its relation to distance along the chromosome is explained, and the evidence from interference concerning the manner of crossing over. It is shown that the cytological evidence for crossing over is inconclusive and that it is not likely that this process occurs at the "strepsinema" stage, as usually figured. The author finally cites the estimates which have been made of the probable maximum diameter that can be assigned to a gene. Dividing sperm head size or chromatin volume by the probable minimum number of genes—as calculated from the relative frequency with which mutations occur in previously known loci (Muller)—the maximum possible gene size turns out to be between 60 and 77 μ . But some of the shorter known "map" distances between genes, if proportionated to the size of the chromosomes which the maps represent, would stand for a real distance of only 20 μ (cf. the haemoglobin molecule of 2 $\frac{1}{2}$ μ).—*H. J. Muller.*

4003. MOTTET, SERAPHIM. La degenerescence de la pomme de terre. [Degeneration of the potato.] Jour. Soc. Nat. Hort. France 23: 263-268. 1922.—Degeneration of potatoes is attributed to (1) influence of diseases; (2) imperfect adaptation of varieties to soil and climate; (3) depletion of nutritive elements in the soil and the formation of toxins; (4) deterioration of the varieties on account of long continued asexual propagation. The main discussion concerns the last cause. The writer admits that the question is debatable but maintains the affirmative that there is an actual degeneration due to senility; the passing out of culture of many varieties is cited as evidence. The influence of degenerative diseases is acknowledged but is not considered the only cause. The suggestion is made that there may be a relation between smooth, regularly shaped tubers with shallow eyes and degeneration.—*C. H. Myers.*

4004. MULLER, H. J. A simple formula giving the number of individuals required for obtaining one of a given frequency. Amer. Nat. 57: 66-73. 1923.—The author presents approximate formula, $\log_e P = -\frac{n}{P - \frac{1}{2}}$, for estimating the chance (P) that a given expected frequency of occurrence (1 in P) may still be correct when no individuals of the minority type have appeared among n individuals. Conversely, the formula can be used for calculating the number of individuals (n) which must be obtained in an experiment to be reasonably sure (chance 1- P) that at least one individual of the minority type may appear where the expected frequency is 1 in P .—*Sewall Wright.*

4005. MÜLLER, K. [German rev. of: PUTTICK, G. P. The reaction of the F_2 generation of a cross between a common and a durum wheat to two biologic forms of *Puccinia graminis*. Phytopath. 11: 205-213. 1921 (see Bot. Absts. 11, Entry 298).] Zeitschr. Pflanzenzücht. 8: 436-437. 1922.

4006. NELLE, WILHELM. Die Beschaffenheit des Gebisses bei kongenitalem Myxödem. [The character of the teeth in congenital myxodema.] p. 50-57. Diss. Bonn Univ.: Jena, 1922.

4007. PEARL, RAYMOND. Some eugenic aspects of the problem of population. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. p. 212-214. Williams & Wilkins Co.: Baltimore, 1923.—This paper is an abstract of the writer's studies of the population problem, which he states "is a problem only because the globe on which we live is strictly limited in size." It has been found that the population growth of every country so far tried, and also experimental population of fruit flies in a pint milk bottle, follow a smooth and regular curve, of which the mathematical equation has been written. The main characteristics of the curve are that the rate of growth is at first slow, increases to a maximum, and then decreases, the universe finally reaching a saturation point. If this saturation point is to be reached in a few centuries it becomes an important question what kind of people will comprise this population. "Here enters the eugenic phase of the problem * * * Birth control offers the most hopeful outlook but it is beset by many difficulties."—*Sylvia L. Parker.*

4008. PEARL, RAYMOND, and T. J. LEBLANC. A further note on the age index of a population. Proc. Nation. Acad. Sci. [U. S. A.] 8: 300-303. 1 fig. 1922.—This paper reports the result of testing the author's age index, proposed in 1920, by computing the indices of a number of communities with 2 different age groupings, one having 6 age groups the other only 3. The communities used were the 99 counties of Iowa in 1915. The correlation coefficient was found to be $+0.84 \pm 0.02$, indicating that the index may be used with considerable confidence, even where the original statistics furnish only 3 broad age classes for the entire life span.—*Sylvia L. Parker.*

4009. RENNER, O. Das Rotnervenmerkmal der Önotheren. [Red veins in Oenotheras.] Ber. Deutsch. Bot. Ges. 39: 264-270. 1921.—This paper deals with a discussion of Heribert Nilsson's view on this subject. The author thinks that the homozygous dominant combination of factors for red veins is zygotic lethal. This opinion is supported by the fact that a large number of aborted seed was observed in the crosses where such a genetic combination was expected. The author suggests that the excess of plants with red veins over the expectancy is due to the faster tube growth of those pollen grains which carry the dominant factor for red veins.—*M. Demerec.*

4010. RENNER, OTTO, und WALTER KUPPER. Artkreuzungen in der Gattung Epilobium. [Species hybridization in the genus Epilobium.] Ber. Deutsch. Bot. Ges. 39: 201-206. 1921.—The results in this preliminary report differ from the conclusions reached by Lehmann. Experiments showed that the reciprocal crosses between species of *Epilobium* are different. Lehmann explains this difference on the assumption that the diploid chromosome set in the parental species consisted of 2 different haploid sets. He parallels the appearance of different reciprocal crosses in *Epilobium* with the similar appearance in the crosses between heterogamous Oenotheras. The authors think that the difference in reciprocal crosses is due to the influence of the cytoplasm which is brought into the cross by one parent only.—*M. Demerec.*

4011. REUTER, M. Zur Frage des Hermaphroditismus beim Wilde. [The question of hermaphroditism in game.] Zeitschr. Forst.- u. Jagdw. 54: 107-110. 1922.—An hermaphroditic deer is described and the common appearance of hermaphroditism among female hyenas is discussed.—*J. Roeser.*

4012. SCHLUMBERGER, OTTO. Pflanzenschutz und Kartoffelzüchtung. [Plant disease control and potato breeding.] Fühlings Landw. Zeitg. 71: 183-191. 1922.—The importance of potato breeding as a means of plant disease control is pointed out. Promising results

obtained by this method in England and the U. S. A. are mentioned. As the breeding for disease resistance is considered the only means of finally solving the problem, Germany is urged to do much more work along this line.—*P. Kvakán*.

4013. SEASHORE, CARL E. Individual and racial inheritance of musical traits. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics, and the family. p. 231-238. Williams & Wilkins Co.: Baltimore, 1923. The gift of music may be enhanced in children from generation to generation by scientific forethought in mating. To this end, the concept of musical talent must be clarified, recognizing that it is not one but a group of hierarchies of talent, each more or less independent of the others; the tonal talents, for example, are as independent of the rhythmic talents as the color of the eyes is independent of stature. Knowledge of the laws of the inheritance of musical talent must be based upon accurate scientific measurements and statistics on the same biological principles as are employed in the study of inheritance in plants and animals. Such factors as the sense of pitch, the sense of rhythm, musical imagination, musical memory, musical intellect, creative imagination, quality of voice, range of voice, and volume of voice, may be isolated and measured or rated in a given individual and the findings may be compared for successive generations. Such of these factors as should be found to be heritable may then be predicted as stature is now predicted with various degrees of certainty on the basis of family history of stature. Such knowledge will be used in the future not primarily in formal eugenic guidance, which is quite within the range of possibility, but rather through the situation that scientific facts of this kind will become a part of the store of common knowledge and will enrich and improve common sense knowledge and natural reactions in courtship and mating. As the rare rose is more beautiful to the botanist and the floriculturist than to the ignorant peasant, so organized knowledge of the laws of musical inheritance will give direction and warmth to nature's spell of love in mating a rare talent with a rare talent.—*Carl E. Seashore*.

4014. SINNOTT, E. W., and GEORGE B. DURHAM. Inheritance in the summer squash. Jour. Heredity 13: 177-186. 2 fig. 1922.—Self-fertile strains in *Cucurbita Pepo* were discovered and a number of pure lines established. Inheritance of various plant characters were studied. White body color in fruit is dominant over yellow and yellow over green. Plain (solid or self) color of fruit is dominant over striping in some cases but appears to be recessive in others. Wartiness of fruit is dominant over smoothness and may be caused by at least 2 independent factors, cumulative in their effect. "Disc" fruit shape is dominant over "sphere," the main difference being due to a single factor although 1 or more additional factors may produce minor effects. White flesh is usually dominant over cream and single blossom-end scar over double, although the latter character is readily modified in its expression by the environment. Many other characters were found to be definitely inherited, but the manner of their inheritance is not as yet clearly established.—*E. W. Sinnott*.

4015. SPRINGER, MARY G. The effect upon developing eggs of extracts of embryos of the same species. Biol. Bull. 43: 75-96. 1922.—Cultures of sea-urchin and starfish were treated with "egg extract," i.e., suspensions of crushed eggs in sea water, distilled water, acidified water, ether and water, acetone and water, or alcohol and water. In general, experiments upon *Asterias* eggs by extracts of the same species in sea water solution showed a slight retardation, a higher degree of cytolysis, and a greater tendency to stop either at the blastula or gastrula stage. Extracts of *Arbacia* larvae, when present in sufficient concentration with any of the solvents mentioned, definitely retarded the development of eggs of the same species, causing cytolysis, arrests of growth, and a very noticeable failure of eggs to develop beyond the early, non-motile blastula stage. If formative substances do exist in the early embryological stages, they are unable, under the conditions tried, to be effective.—*Caroline M. Perkins*.

4016. STAFFE, ADOLF. Untersuchungen über die Augen- und Haarfarbe der Schulkinder des Kuhländchens. [Investigations on the eye and hair color of the school children of Kuhländchen.] Arch. Rass.-u. Ges. Biol. 14: 305-314. 1922.—Blue eyes and blonde hair are Nordic characteristics the inheritance of which has been extensively studied; their frequency afford a good index of the amount of Nordic blood in a population. In this study of 3,058 boys and 3,014 girls, 6-14 years of age, the frequency of blue eyes was found to be 46 per cent and of blonde hair 59 per cent as compared with 47 and 75 per cent, respectively, for Swedish recruits. This tends to confirm the ethnological evidence that the people of Kuhländchen, the region of Mendel's nativity, are of prevailing Nordic origin. It must be borne in mind however that children tend to become darker with age, a phenomenon which the author attributes to heterozygosis with early incomplete dominance. In this material blue eyes and light hair were not closely associated. The frequency of blue eyes among girls was found to be slightly greater than among boys. The author believes with Lanz that the supposed dominant sex-linked 2nd factor for eye pigmentation is peculiar to Mongolian strains and their hybrid descendants. Red hair (1.38 per cent) was found to be twice as common among boys as among girls, suggesting a sex-linked epistatic factor. Freckling is strongly associated with light and especially red hair. The same is possibly true of birthmarks and naevi.—C. H. Danforth.

4017. SYERDRUP, ASLAUG. Postaxial polydactylism in six generations of a Norwegian family. Jour. Genetics 12: 217-240. 6 pl., 1 fig. 1922.—Two types of postaxial polydactylism are recognized. Type A, the more pronounced form, is characterized by the strong and equal development of the 5th and 6th digits, generally associated with a more or less defective additional metacarpal or metatarsal. The trait may manifest itself in any or all extremities, but the right hand shows a more variable tendency than the left. Type B is characterized by small supernumerary fingers without bony connection with the rest of the hand. The feet of individuals with type B hands may show as extreme a development of polydactylism as those belonging to type A. Polydactylism of both types is transmitted regularly by affected parents to part of their offspring. However, in one line the number of affected individuals is in excess of 50 per cent (17: 8) and here most of the cases are of type A, while in another line the number of polydactylous individuals is less than would be expected (8: 14) and all are type B. Similar observations have been reported by others, from which the author is led to suggest that type A is the product of cumulative factors while type B is due to only 1 factor. It seems probable that the latter may sometimes be suppressed by an inhibiting factor. Associated with type A is a clearly demonstrable shortening of the 5th metacarpal bone but it has not been determined whether this is a secondary manifestation or is due to a separate gene linked with one of those for polydactylism.—C. H. Danforth.

4018. SWINGLE, W. W. Is there a transformation of sex in frogs? Amer. Nat. 56: 193-210. 1922.—The author replies to E. Witschi [Amer. Nat. 55: 641.] who is said to be convinced that the problem of sex development and differentiation in frogs has been settled. The author feels that the time has come for a revision of the entire question of sex development in Anurans. Evidence is adduced to show that Bidder's organ is homologous to the pro-testis of frogs, and is not a rudimentary ovary, except in females. He does not agree with Witschi on parallelism in behavior of Müllerian ducts and the gonads. Hermaphroditism in frogs is considered.—R. K. Nabours.

4019. SWINGLE, W. W. Spontaneous metamorphosis of the American axolotl. Amer. Nat. 56: 560-567. 1922.—Autoplastic and homoplastic thyroid transplantation appeared to have no effect on the metamorphoses of the American axolotl; whereas heteroplastic, using the glandular tissue of *Necturus*, and thyroid feeding, using desiccated thyroid tissue with 0.21 per cent iodine, both had perceptible influence in hastening metamorphosis. Heteroplastic pituitary transplantation gave indefinite results. Thyroidectomy performed before the onset of metamorphosis effectively prevented the latter, while thyroidectomy after the onset of metamorphosis had no effect. These animals were not entirely satisfactory material. There is discussion of other matters concerning axolotls, and the influence of their thyroids on metamorphoses in other Amphibia.—R. K. Nabours.

4020. TJEBBES, K., en H. N. KOOIMAN. Erfelijkheidsonderzoekingen bij boonen. VII. Bloemkleur en zaadhuidkleur. [Genetic investigations on beans. Flower color and seed coat color.] VIII. Over de erfelijkheid van de eigenschap dorschbaarheid van de pene. [Concerning the inheritance of threshability of the pod.] *Genetica* 4: 447-456. 1922.—From various crosses with beans the authors are led to conclude that: (1) there is an intensifying factor for color, *F*, which when acting with 1 or more of the factor complexes *AB*, *AC*, or *AD* produces lilac flower color; (2) there is a different factor, which, although it has no definitely clear influence on the colors of the seed coat, can nevertheless cause the flowers to be colored, as is shown by the brown beans with colored and white flowers; (3) in connection with the reports of Shaw and Morton it must be assumed that the factor *F* may be disturbed in its action by the factor producing the "eyed" condition. Crosses between threshable and non-threshable varieties of beans reveal 1 main factor difference, the threshable condition being dominant. The results in F_2 do not constitute a very close fit (174:38) but the F_3 generation gives a ratio more nearly in accordance with expectation (1572:572).—A. R. Saunders.

4021. VOGT, A., und R. KLAINGUTI. Weitere Untersuchungen über die Entstehung der Rotgrünblindheit beim Weibe. [Further investigations on the origin of red-green blindness in women.] *Arch. Rass.- u. Ges. Biol.* 14: 129-140. 1922.—An examination of 2238 Basel school girls 11-16 years old revealed 8 cases of colorblindness. This is about the frequency of colorblindness among women of Central Europe generally (0.4 per cent). The affected subjects and as many of their relatives as could be reached were subjected to careful study to test the theory that colorblindness is a typical sex-linked trait. The evidence is all in accord with this hypothesis. It is noteworthy that 2 colorblind parents produced only colorblind children, 1 son and 2 daughters; and that the marriage of a colorblind man with a (presumably) heterozygous woman resulted in all 4 of the possible types of offspring. The authors are inclined to doubt the genetic separateness of the different forms of colorblindness, although this question is left open.—C. H. Danforth.

4022. WELLENSIEK, S. J. De erfelijkheid van het al of niet bezit van "draad" bij rassen van *Phaseolus vulgaris* L. [Heredity of stringiness of *Phaseolus vulgaris* varieties.] *Genetica* 4: 443-446. 1922.—The writer crossed 3 pure lines of stringless beans with a variety, "Wagenaar," having a high degree of stringiness. In the F_1 generation the stringless condition was dominant, with monohybrid segregation in F_2 . The actual ratios agree well with the expected results and apparently there exists a monofactorial difference between the variety "Wagenaar" and the stringless pure lines.—A. R. Saunders.

4023. WINGE, Ö. A peculiar mode of inheritance and its cytological explanation. *Jour. Genetics* 12: 137-144. 1 pl., 8 fig. 1922.—Inheritance of black-spotted versus non-spotted dorsal fin in the fish *Lebistes reticulatus* had been found by J. Schmidt [see Bot. Absts. 10, Entry 1748] to follow the distribution which a Y chromosome would have. In cytological examination Winge finds 23 pairs of chromosomes, all 46 very much alike, at maturation in the male; 46 were also counted in female somatic cells and indicated in oogenesis. Though no sex chromosomes were identified, he assumes the male to have had XY, the female XX, as required by the genetic results. He proposes the term "one-sided masculine inheritance" for Schmidt's case, and states that sex-linked inheritance of the *Drosophila* type has also been found in *Lebistes*.—H. J. Muller.

4024. WINGE, Ö. The interaction between two closely linked lethals in *Drosophila* as the cause of the apparent constancy of the mutant "spread." *Genetica* 4: 321-338. 1922.—A stock of *Drosophila melanogaster* characterized by holding the wings outstretched was found to differ from the wild type in 2 factors: (1) a gene responsible for the morphological peculiarity, acting as a 3rd chromosome dominant with a recessive lethal effect; (2) a lethal in the opposite chromosome, crossing over with the 1st gene in about 1 per cent of cases and thus causing the stock to breed almost true. The author supposed that the stock was identical with spread

and concluded that the published accounts of spread as a recessive are incorrect; but in a note added to the reprints he explains that the stock he worked with is not spread but dichæte and agrees with dichæte in its behavior [see Bot. Absts. 12, Entry 4001.]-*Alexander Weinstein.*

4025. WOLFE, A. B. *Eugenics and social attitudes.* 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. p. 413-418. Williams & Wilkins Co.: Baltimore, 1923.—The unmanageableness of society results from a maladjustment between the need of rational cooperative control and the conflict instincts inherited from the biological past, and the hold-over of political and economic individualism from the 18th century. The deficiency is one of proper attitudes more than of intellectual capacity. The task of eugenics is therefore not only selections for capacity but the development in the population at large, through every available means, of attitudes suitable to social requirements. Unless this is done selective eugenics stands little chance of adoption by democratic societies. Such a broadening of aim is in accord with Galton's definition of eugenics. The most dangerous dysgenic element is not necessarily in the "lower" classes, but, as concerns attitudes, may be found in the middle classes. The most pressing tasks are: (1) to develop all the intellectual capacity; (2) to free knowledge from censorship of any kind; (3) to acquire in the general population a scientific attitude; (4) to develop mutual tolerance and understanding; (5) to acquire a morality of self-respect; (6) to substitute workmanship for acquisitiveness, and cooperation for conflict. Human attitudes and their modification should be the prime interest of all the eugenisists except technically trained genetists.—*A. B. Wolfe.*

4026. YOUNG, C. C. *Practical tests in Karakul breeding.* Jour. Heredity 13: 229-236. 1922.—It has been found that the sheep thrive in a variety of climates but seem to do best under desert conditions. By properly selecting long-wool ewes it has been found possible to obtain high grade Karakul pelts by crossing with the imported rams, as the black, tightly curled wool of the Karakul seems to be entirely dominant. It is emphasized that the Karakul is a mixed breed, as the natives of the Kara-Kum region have no conception of scientific breeding and cross their fur sheep with all other native strains.—*R. C. Cook.*

4027. ZELENY, CHARLES. The temperature coefficient of a heterozygote with an expression for the value of a germinal difference in terms of an environmental one. Biol. Bull. 44: 105-112. 3 fig. 1923.—The heterozygote between normal full eye and ultra-bar eye in *Drosophila* shows an increased number of ommatidia as the temperature at which the larvae are reared decreases, at a rate similar to that characteristic of ultra-bar and not of full eye. Although a single ultra-bar factor is not sufficient to bring about a complete effect in reducing ommatidia number as produced by 2 ultra-bar factors, it is sufficient to produce the complete change to a physiological system of the ultra-bar type. The gene ultra-bar has the same type of reaction as a temperature difference. On the logarithmic scale of ommatidia number it is possible to express the relation between the germinal factor and the environmental factor as a constant.—*D. F. Jones.*

HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issue Entries 3662, 3729, 3738, 3761, 3771, 3796, 3815, 3872, 3898, 3951, 3966, 3967, 4134, 4355, 4400, 4448, 4467, 4477, 4578, 4586, 4590)

FRUITS AND GENERAL HORTICULTURE

4028. ANONYMOUS. Pollination in orchards. New Zealand Jour. Agric. 25: 148-150. 1 chart. 1922.—Some recent investigations are reviewed.—*N. J. Giddings.*

4029. ANONYMOUS. Tree surgery as applied to citrus. Florida Grower 27³: 6. 6 fig. 1923.—Tree surgery proved successful. The treatment of wounds and application of materials were essentially the same as with other kinds of trees.—*J. C. Th. Uphof.*

4030. ANONYMOUS. Varieties of fruit recommended for planting in British Columbia. British Columbia Dept. Agric. Circ. New Hort. Ser. 64. 4 p. 1922.

4031. ANONYMOUS. Verslag over het jaar 1920 van het Department van den Landbouw in Suriname. [Report for the year 1920, Department of Agriculture, Surinam.] 129 p. Paramaribo, 1920.—Short reports are given of the culture, harvest, and condition of the following: coffee, cocoa, coconuts, cotton, rice, malachra. The management of government forests is also reported.—*J. C. Th. Uphof*.

4032. ALLEN, W. J. Some experiments in the storage of lemons. Agric. Gaz. New South Wales 34: 127. 1923.—Treatment of lemons with slaked lime dust to prevent decay showed slight advantage over no treatment and more marked advantage than dusting with sulphur or coating with vaseline.—*L. R. Waldron*.

4033. ANTHONY, R. D., and J. H. WARING. Methods of interpreting yield records in apple fertilization experiments. Pennsylvania Agric. Exp. Sta. Bull. 173. 42 p. 1922.—The author discusses methods used in conducting and reporting orchard field trials based on data taken from 5 orchards in Pennsylvania beginning in 1907 and 1908. The general plan of each test is described, with notes on types of soil and special conditions present in each orchard. The yield records on the various plots are interpreted through the comparative use of Bessel's and "Student's" formulae for determining the probable error. Attention is called to the necessity of reducing the common factors of variability such as topography, soil, and unknown stocks as well as the need of increasing the number of trees under treatment. Certain results for the orchardist are derived; "apple trees standing in a non-legume sod must receive nitrogenous fertilizers. Commercial carriers of nitrogen have proved as valuable as manure. Trees under cultivation have not shown a profitable return from the addition of fertilizers when a good cover crop was grown. Where a cover crop was not grown in the cultivated plots the trees did not maintain their vigor."—*C. R. Orton*.

4034. ARENS, P. Het planten met marcotten. [Planting with "marcotts."] Arch. Rubber cult. 5: 382-387. 1921.—An account is given of a number of plantings with "marcotts." Most of these were successful, and the trees could be tapped sooner than when stumps were planted. This method is not considered objectionable if good roots are developed before planting.—*C. D. La Rue*.

4035. BARSS, A. F. Small fruit survey. British Columbia Dept. Agric. Circ. 39. 15 p. 1922.—A report is made on the cost of growing strawberries and red raspberries in certain coast sections of British Columbia during 1921.—*J. W. Eastham*.

4036. BECKWITH, CHARLES S. Report of the cranberry substation. Proc. Amer. Cranberry Growers Ann. Meeting 53: [Unpaged.] 1923.—On savannah land where vine growth was not excessive a complete fertilizer gave in 4 successive years an increase of 20, 68, 73, and 107 per cent, respectively, over the unfertilized plot, which yielded 35 barrels per acre, which is twice the average for New Jersey. Recent tests show that nitrate of soda is more efficient than dried blood. On muck soils no fertilizer is known that can be safely used year after year.—Treatments of from 1,000 to 12,000 pounds of lime per acre have not yet given results.—Three spray applications were effective in keeping the berries sound until Aug. 1, by which time those on unsprayed plots had rotted; by Aug. 25 all had rotted. Summer flooding destroys part, if not all, of the cranberry girdlers but may cause rot.—Data are being collected relative to frost prediction.—*J. K. Shaw*.

4037. BEVAN, W. The Sultana vine in Cyprus. Cyprus Agric. Jour. 18: 9-10. 1923.—In 1913, cuttings of this seedless grape were imported from Crete and distributed to vine growers. While good yields have been secured they do not equal those obtained in Crete. It is thought that more intelligent pruning may increase the yield.—*W. Stuart*.

4038. BOBILIOFF, W., en C. A. GEHLSSEN. Over het uitdunnen volgens bastonderzoek op de gouvernementsrubberonderneming "Vada." [The use of bark investigation as a guide in thinning on the government estate "Vada."] Arch. Rubbercult. 5: 406-412. 1921.—The study of the bark is compared with production as a means of thinning on the government estate "Vada." Eight hectares were thinned, 4 by each method. In 3 cases out of 4 the bark investigations gave better results than yield data.—*C. D. LaRue.*

4039. CHEVALIER, A. L'olivier Arbéquina. [The Arbequina olive.] Rev. Bot. Appl. 2: 26-27. 1922.—This olive variety is cultivated in the province of Lerida, Spain, where it represents 92 per cent of all varieties planted. It is more resistant to cold than any of the other varieties there grown and is reported to be a heavy bearer. Every 2 years, in some cases more often, the trees are severely pruned to expedite gathering the fruits.—*Paul Russell.*

4040. CRAWFORD, R. P. World crops for America. Sci. Amer. 126: 226-227. 5 fig. 1922. A brief popular description is given of the ways in which plants are sought abroad and brought to American experiment stations for testing.—*Chas. H. Otis.*

4041. DAVIS, KARY C. Horticulture. A text book for high school and normals. vi + 416 p., 287 fig. J. B. Lippincott Co.: Philadelphia, 1922.—This volume is designed to give to students a course in gardening, orcharding and small fruits that will cover the horticultural field, omitting unessentials. Six chapters are devoted to preliminary studies and plant propagation; 6 to vegetable gardening; 6 to various phases of orcharding; 4 to small fruits, nuts, etc.; 1 to the home wood lot and forestry; and 1 each to soil improvement, the home and school grounds, weeds, and birds; also an appendix with data of value to the student and grower.—*J. H. Gourley.*

4042. DONKERSLOOT, F. W. De vegetatieve vermenigvuldiging van Hevea als kebonpraktijk. [Vegetative reproduction of Hevea as an estate practice.] Arch. Rubbercult. 5: 510-540. 1921.—This is a full account of the methods of vegetative reproduction of *Hevea brasiliensis* developed on the estates of the Holland-American Plantation Co. under the direction of the botanist. Cost accounts, etc., are given.—*C. D. La Rue.*

4043. ESBJERG, NIELS. Forsøg med Sorter af Stikkelsbaer 1910-1920. [Experiments with gooseberries, 1910-1920.] Tidsskr. Planteavl. 28: 596-614. 1922.—This report on the work of the state agricultural experiment station on methods of raising gooseberries for the market includes a discussion of diseases and other factors. The gooseberry is relatively a much more important crop in Denmark than it is in America.—*Albert A. Hansen.*

4044. FLETCHER, F. J. Market nursery work: A series of six books on the cultivation of crops for market. Vol. VI. Decorative plants, trees and shrubs. vi + 68 p., 23 fig. Benn Bros.: London, 1922.—This reference book is designed to assist nurserymen.—*J. H. Gourley.*

4045. GALLOWAY, B. T. An historic orange tree. Jour. Heredity 13: 163-166. 2 fig. 1922.—The introduction of the original Washington naval orange tree from Bahia, Brazil, is recounted. Twelve trees were sent to William Saunders, Plant Propagator in the U. S. Department of Agriculture. From these he budded other trees which he sent to Miss Elizabeth Tibbetts, Riverside, California. Of these original budded trees 1 is still living at Riverside and 1 in the citrus greenhouse at Washington. From these trees has developed the entire navel orange industry of California.—*Robert C. Cook.*

4046. GALLOWAY, B. T. Improved method of propagating the Litchi. Jour. Heredity 13: 201-206. 5 fig. 1922.—The Litchi is one of the principal fruits of South China, but is practically unknown in the Western Hemisphere. This is in part due to the fact that the seed perish if not planted immediately and to the great difficulties of propagation. Inarching is the method used by the Chinese, but it is slow and produces misshapen plants. The Office

of Foreign Seed and Plant Introduction, U. S. Department of Agriculture, has developed a steam-heated propagating case in which the cuttings are placed. This insures uniform temperature, light, and humidity, and with proper soil ($\frac{2}{3}$ peat and $\frac{1}{3}$ sand) very satisfactory results are reported.—*R. C. Cook.*

4047. GANDRUP, JOHANNES. Over den invloed van teer op Heveaschors. [The influence of tar on Hevea bark.] Arch. Rubbercult. 5: 549-559. 1921.—Tar has no effect on the renewal of bark which has been scraped away, as in the treatment of disease. Where the scraping extends nearly to the cambium the tar kills it and increases the size of the wound.—*Carl D. LaRue.*

4048. GEHLSSEN, C. A. De waarde van het bastonderzoek voor de plantsoensveredeling. [The value of bark examination in thinning.] Arch. Rubbercult. 5: 453-463. 1921.—The author finds no difference in reliability between bark examination and yield as criteria for thinning rubber plantations; and as bark examination is cheaper it is preferable.—*C. D. LaRue.*

4049. GRANTHAM, J. Over het Uitdunnen volgens bastonderzoek op de gouvernement's rubberonderneming "Vada." [Thinning by means of bark examination on the government rubber estate "Vada."] Arch. Rubbercult. 5: 541-542. 1921.—The author criticizes Bobilioff and Gehlsen [see Bot. Absts. 12, Entry 4038], claiming that their data are not sufficiently reliable to permit of definite conclusions.—*C. D. LaRue.*

4050. HENDRICKSON, A. H. Further experiments in plum pollination. California Agric. Exp. Sta. Bull. 352. 247-266. 1922.—Results are reported from 3 years' work in 2 California counties on additional varieties, many of which have recently become prominent. The value of honey bees in orchards of shipping plums is emphasized. In addition to varieties previously reported the following Japanese plums proved self-sterile: Apex, Duarte, El Dorado, Formosa, Gaviota, Prize, and Upright. In 3 years' experiments, Formosa and Gaviota were shown to be inter-sterile. Beauty, Methley, and Santa Rosa seemed to be self-fertile, at least to a limited degree. Apex, El Dorado, Formosa, Gaviota, and Kelsey were generally scanty pollen producers and therefore of questionable value as pollinators of other Japanese varieties. Beauty, Burbank, Duarte, Santa Rosa, and Wickson seemed to be the most effective pollinators for the Japanese varieties. Among the European varieties, Imperial and Tragedy were again shown to be self-sterile. Likewise President, Quackenboss, Standard, and Washington failed to set fruit with their own pollen. Diamond set well with its own pollen 1 year, but failed to do so the other 2; for practical purposes it must be considered self-sterile. Pond (Hungarian or Gros prune) when pollinated with its own pollen set no fruit in 1920, but set a light crop in 1922; it is probably partially self-fertile. California Blue, Giant, and Yellow Egg proved self-fertile. Grand Duke, contrary to results obtained at Davis, California, where it was found to be self-sterile under certain conditions, set a small percentage of fruit with its own pollen. All European plums blossoming in midseason or later appeared to be able to cross-pollinate effectively. Tragedy was able to pollinate the Japanese varieties but was not pollinated by them. The presence of honey bees materially aided in setting heavy crops on the following combinations of varieties: Formosa and Wickson; Beauty and Santa Rosa; Diamond and Grand Duke. Observations showed that many other combinations were benefitted by bees. Inter-pollination of Formosa and Gaviota by bees failed; interplanting of these varieties for cross-pollination purposes cannot be recommended. The results showed that whenever a particular cross had been made for 2 or 3 successive years the percentage of set was usually lowest in 1922, a fact probably due to the prolonged period of cold rainy weather during the blossoming season of that year.—*A. R. C. Haas.*

4051. HILLENMEYER, H. F. Synoptic history of the American grape. Nation. Nurseryman 314: 97-99. 1923.—An historic statement is given of grape culture in American and particularly in Kentucky, together with critical observations.—*J. H. Gourley.*

4052. LA RUE, CARL D. Structure and yield in *Hevea brasiliensis*. Arch. Rubbercult. 5: 574-588. 1921.—The correlation between the number of rows of latex-vessels in the outer bark and those in the inner bark is 0.094 ± 0.059 in the case of 126 seedlings 2½ years old, while for mature trees it is no higher. It therefore appears that trees do not produce latex-vessel rings at a uniform rate and that the number of vessels in a seedling cannot be taken as a criterion of the number the mature tree will possess. The correlation between yield of dry rubber and number of rings of latex vessels is 0.513 ± 0.016 , between yield of dry rubber per year per cm. of width of tapping surface and number of latex-vessel rings, 0.0457 ± 0.017 . The bark types as based on distribution of stone-cell layers described by Bobilioff (Arch. Rubbercult. 2: 1918) could not be distinguished in this investigation. The structure of the bark of a given tree may change under certain conditions. The following correlations are given: between yield of rubber and circumference of tree, 0.299 ± 0.019 ; circumference of tree and thickness of bark, 0.26 ± 0.02 ; number of latex-vessel rings and circumference of tree, 0.162 ± 0.021 ; thickness of bark and number of rings of latex-vessels, 0.15 ± 0.02 ; increase in girth and yield of rubber, 0.375 ± 0.038 . These indicate the importance of rapid growth of the trees during the whole period of production. Approximately 1000 trees were used in computing the correlations.—C. D. LaRue.

4053. LESOURD, F. Rajeunissement des pêcheurs en plein vent. [Rejuvenation of peach trees out of doors.] Rev. Hort. 91: 432. 1921.

4054. MAAS, J. G. J. A. Uitdunnen volgens bastonderzoek. [Thinning by bark examination.] Arch. Rubbercult. 5: 543-548. 1921.—The author criticizes Bobilioff and Gehlsen [see Bot. Absts. 12, Entry 4038], showing the unreliability of their data.—C. D. LaRue.

4055. McCORMICK, A. C. Blight resistance in pear stocks. Nation. Nurseryman 314: 112, 114. 1923.

4056. MASON, S. C. The Saidy date of Egypt: a variety of the first rank adapted to commercial culture in the United States. U. S. Dept. Agric. Bull. 1125. 35 p., 8 pl., 4 fig. 1923.—Of hundreds of varieties of the date palm few have attained commercial importance in Europe or America and the discovery of the adaptation to southern California of the Egyptian Saidy (Sayd or Saydeh) variety "marks a new era in date production in the United States." Much space is devoted to such topics as: character and early history of the Libyan oases (the home of the Saidy date), early Egyptian knowledge of the date palm, accounts of oasis dates by modern teachers, the proof of the identity of "Wahi," "Sewi," and Saidy dates, and its standing as a commercial variety. A study of the temperature requirements for the Saidy date shows that conditions at Mecca, California, are very nearly identical with those of the Egyptian oases. At Temple, Arizona, there is a deficiency in the mean minimum temperature curve of 7-8°F. between flowering time and midsummer, a condition which may account for the fact that these dates fail to mature at the Temple gardens. Saidy dates also have greater resistance to atmospheric humidity than such varieties as Deglet Noor, rendering them more immune to the smut fungus *Graphiola phoenixia*, and suitable for culture to a vast area of the Imperial Valley of California and the lower Colorado Valley of both California and Arizona.—J. T. Buchholz.

4057. MIDDLETON, W. A. Yields, grades, prices and returns for apple varieties in the Okanagan Valley. British Columbia Dept. Agric. Bull. 90. 13 p. 1922. —A comparison is made of 25 commercial varieties.—J. W. Eastham.

4058. PECK, H. H. An object lesson to citrus growers. Agric. Gaz. New South Wales 34: 70. 1923.

4059. PRICE, J. C. C. The grape. Alabama Agric. Exp. Sta. Bull. 211. 33-50. 14 fig. 1920.—This is a report of tests of 48 varieties of bunch grapes and 6 of muscadine grapes.

Technical descriptions of the several varieties of fruit and photographs of typical clusters are furnished. Judged by the productiveness, hardness, and vigor over a period of 6 years under similar conditions and treatment on the Experiment Station Farm at Auburn, Alabama, the following bunch grapes are considered best suited to Alabama conditions: Brighton, Catawba, Concord, Delaware, Diamond, Ives, Isabella, Moore, Niagara, Warden, and Winchell. The results with muscadines are not as clear cut, though Scuppernong and Thomas grapes seem to be the best of those tested.—*W. A. Gardner.*

4060. PROSCHOWSKY, A. R. *Butia capitata* (Becc.) var. *deliciosa*. Rev. Hort. 94: 39. 1922.—The fruits are entirely without fiber, easily freed from the stone, and of agreeable, sub-acid flavor. The tree withstands drought and relatively low temperatures without injury.—*E. J. Kraus.*

4061. ROBERTSON, W. H. The growth of the small-fruit industry [in British Columbia.] Agric. Jour. [British Columbia] 7: 270-271. 1923.

4062. SCHUSTER, C. E. Filberts. Oregon Agric. Exp. Sta. Circ. 28. [Unpaged.] 1922.—The author discusses suitable soils, propagation, planting, cultivation, pruning, harvesting, varieties, and cross-pollination.—*C. E. Owens.*

4063. SCHUSTER, C. E. Pollination of the sweet cherry. Oregon Agric. Exp. Sta. Circ. 27. [Unpaged.] 1922.—Self-sterility, inter-sterility, pollinizers and cross-pollination, number of pollinizer trees, varieties suitable for pollinizers, and part played by bees are discussed.—*C. E. Owens.*

4064. SCHUSTER, WILH. Das liebliche Blümchen Borretsch. [The lovely borage blossoms.] Die Biene 61: 23. 1923.—Borage (*Borago officinalis*) was formerly used extensively in salads as well as recognized as a desirable honey plant.—*M. G. Dadant.*

4065. SIMPSON, R. Government nurseries at Oliver, B. C. Agric. Jour. [British Columbia] 7: 222-223. 1922.

4066. STAHEL, GEROLD. Eukele praktische wenken voor het oculeeren van cacao. [Some practical hints in budding cacao.] Dept. Landb. Suriname Mededeel. 17. 2 p. 1919.—Seed for stocks must be selected from very strong trees. The seedlings with 2-3 leaves are transplanted in well shaded nursery rows; when 1½-2 years old they are usually 2½-3 feet high and suitable for budding, which is done by the Forkert method preferably in the first weeks of the rainy season. Within 2-3 weeks the top of the plant is bent over and tied to a neighboring one so that the budded part is at the uppersurface. When the bud has produced a shoot 1½ feet long (4-6 months) the bended portion of the stem is cut off directly above the budding place. Budding wood may be used only when the bark has a dark brown color.—*J. C. Th. Uphof.*

4067. STEINMANN, A. Over den invloed van teer op de regeneratie van den bast bij *Hevea brasiliensis*. [The influence of tar on the renewing bark of *Hevea brasiliensis*.] Arch. Rubbercult. 5: 495-503. 1921.—An increased thickness of bark may be secured by the use of coal tar, due to increased activity of the cork cambium. Since no increase takes place in the latex-bearing part of the bark the application of tar is not advised.—*C. D. LaRue.*

4068. STEVENS, NEIL E. The possible relation of spring temperatures to the keeping quality of the cranberry crop. Proc. Amer. Cranberry Grower's Ann. Meeting 53: [Unpaged.] 1923.—Supranormal temperatures during the shipping season and excessive precipitation during the harvest period are unfavorable for good keeping qualities of cranberries. It is shown that accumulated excess temperatures during May and June are usually correlated with poor keeping quality of the crop for that season. Data for the years 1912-1922 show only 1 year in which this general relationship does not hold; it is thought that this season was too

cool for favorable development of the cranberry crop. It is thought that a knowledge of the temperatures for May and June will be of value to sales agents in handling the crop for the season.—*J. K. Shaw.*

4069. STOKLEY, C. L. **Succeeding with the Cavendish banana.** Florida Grower 27¹⁰: 8-9. 1923.—Conditions in parts of Florida are suitable for commercial banana growing. Pure muck soils on which water does not stand are best although higher land answers if well supplied with humus and irrigated. Fertilizer is necessary for high yields. Plants set out in March or April produce fruit the following autumn, 1 acre yielding as much as 400 bunches.—*J. C. Th. Uphof.*

4070. STUBENRAUCH, A. V., MILO N. WOOD, and CHARLES J. BOOTH. **Horticulture for schools.** *xxiii + 325 p., 8 pl., 135 fig.* Macmillan Co.: New York. 1922.—“This book is intended as a text-book of horticulture for high-schools and for other schools requiring a text for pupils of high-school grade, and also for use in homes and reading courses.” The major portion of the material in this volume was brought together by the senior author but after his death it was completed by the junior authors.—The material is elementary in nature and the number of subjects treated is extensive for the size of the book.—Five chapters treat of the plant and its propagation; 4 of vegetable culture; 4 of deciduous fruits and orchard management; 1 of semi-tropical fruits; 1 of small fruits and the grape; 2 of marketing; 1 of incidental products; and 1 of the use of ornamental plants.—*J. H. Gourley.*

4071. TUFTS, WARREN P. **Thinning deciduous fruits.** California Agric. Exp. Sta. Circ. 258. 13 p., 5 fig. 1923.—Specific recommendations are given.—*A. R. C. Haas.*

4072. VINKEN, E. J. **De papaja.** [The papaya.] West Indië 5: 32-35. 1920.—This contains a description of papaya growing. Two instances are cited of a male tree producing fruit. Attempts to change a staminate into a pistillate tree by incisions failed.—*J. C. Th. Uphof.*

4073. VISCHER, W. **Over samengestelde kurkhuidvorming en natuurlijke bastvernieuwing bij Hevea brasiliensis.** [Cork formation and bark renewal in Hevea brasiliensis.] Arch. Rubbercult. 5: 486-492. 1921.—Successive layers of cork cambium are formed one inside the other. Since the outer layers die and are shed, bark affected with brown bast disease may ultimately be thrown off. It was found that the application of tar greatly increases the local activity of the cork cambium.—*C. D. La Rue.*

4074. WALLE, PAUL. **La culture du caféier dans l'état de São-Paulo.** [Culture of coffee in the State of São Paulo.] Rev. Bot. Appl. 2: 5-11. 1922.—The present status of the coffee industry is considered, with brief historical notes, and attention is called to its amazing growth during the past 100 years. The writer then takes up the area occupied by the coffee plantations, method of cultivation, diseases, yield, preparation for the market, principal varieties grown, commercial aspect of the industry, and the future of coffee growing in the state of São Paulo, which he regards as promising.—*Paul Russell.*

4075. WHITE, ELIZABETH C. **Report of progress in blueberry culture.** Proc. Amer. Cranberry Growers' Ann. Meeting 53: [Unpaged.] 1923.—A 16-acre plantation more or less in bearing yielded about 1,000 bushels. Nearly all the plants were seedlings and showed much individuality in frost injury. Seedlings on lower ground but from frost-resistant parents showed no damage. Certain named varieties were frost resistant.—*J. K. Shaw.*

4076. WOLK, P. C. VAN DER. **Opkomst en nieuwe wegen der cocos-cultuur.** [Rise and new methods of cocos growing.] West Indië 4: 116-130. 1919.—In transplanting cocos seedlings care should be taken to protect the roots from injury. The vertical method results in germination within 4 months rather than 9, and the seedlings can be planted deeper. Artificial irrigation is desirable.—*J. C. Th. Uphof.*

4077. WRIGHT, WALTER PAGE. **Practical gardening for pleasure and profit.** 6 vol. 367, 365, 367, 359, 370, and 376 p., illus. Educational Book Co.: London, 1922.—These volumes give a comprehensive treatise of gardening in all its phases. Several other writers have contributed, which has resulted in a cyclopedia of information. The volumes treat respectively of: (1) gardening practice and plant life; (2) vegetables and their cultivation; (3) practical fruit growing; (4) glass houses and pot plants; (5-6) the flower garden.—*J. H. Gourley.*

4078. WYMAN, RICHARD M. **Cultural notes.** Amer. Nurseryman 374: 91. 1923.—This article tells how to handle and transplant nursery stock, especially of evergreens and deciduous shade trees, from the seed bed to the field.—*J. H. Gourley.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

4079. ANONYMOUS. **Killing weeds on paths and lawns.** New Zealand Jour. Agric. 24: 304. 1922.

4080. ANONYMOUS. **Sterilization of soil in glass houses.** New Zealand Jour., Agric. 25: 42-46. 5 fig. 1922.—Apparatus and methods for rapid and effective steam sterilization are discussed. Such sterilization is of doubtful value for eelworm control as thorough treatment is not likely to extend to a depth greater than 9 inches while eelworms may be found at 18 inches.—*N. J. Giddings.*

4081. ALDERWERELT VAN ROSENBURGH, C. R. W. K. VAN. **Index Pteridophytorum quae anno 1919 in Horto Botanico Bogoriensi coluntur.** [Index of pteridophytes cultivated in 1919 in the Botanic Garden at Buitenzorg.] Bull. Jard. Bot. Buitenzorg III, 1: 358-351. 1919.

4082. COSTANTIN ET MAGROU. **Applications industrielles d'une grande découverte française.** [Practical applications of a great French discovery.] Ann. Sci. Nat. Bot. 4: i-xxxiii. Fig. 1-32. 1922.—A discussion is given of commercial attempts in growing orchids from seed by inoculation with certain endophytic fungi.—*Paul Weatherwax.*

4083. DAVIDSON, H. C. **The culture of pot plants: in rooms, greenhouses, and frames.** vii + 154 p. C. Lockwood & Son: London, 1922.—In this practical treatise on the handling of ornamental plants in the house and under glass, chapters are devoted to handling house plants; annuals; herbaceous perennials; hardy and tender shrubs; scented and bulbous plants; and pot plants.—*J. H. Gourley.*

4084. FINDEISEN, THEODOR. **Einiges über Azaleentreiberei.** [About azalea forcing.] Möllers Deutsch. Gärt. Zeitg. 38: 6-7. 1923.—In forcing *Azalea indica* proper light is of as much importance as heat. Detailed cultural directions are given.—*J. C. Th. Uphof.*

4085. LAPLACE, F. **Culture des Nymphaea bleus comme plantes annuelles.** [The culture of blue Nymphaeas as annuals.] Rev. Hort. 94: 10-12. Fig. 3. 1922.—Plants from seed started in the greenhouse from November to March, when planted in the open near the end of May, flower from July until freezing weather. A number of species and varieties are listed.—*E. J. Kraus.*

4086. LESOURD, F. **Trois variétés de dahlias simples.** [Three varieties of single dahlias.] Rev. Hort. 94: 34. 1 pl. (colored.) 1922.

4087. MACSELF, A. J. **Hardy perennials.** 219 p., color photographs, water-color drawings, line drawings. T. Butterworth, Ltd.: London, 1922.—This is a general treatise on the culture of hardy perennials together with a description of a number of "those that are worth growing." Planting, propagating hardy plants, care of plants in the garden, and plants worth growing are discussed in separate chapters.—*J. H. Gourley.*

4088. MOTTET, S. *Eucryphia pinnatifolia* Spach. Rev. Hort. 94: 32-34. Fig. 8-9. 1922.

4089. PRESCOTT, EDWARD E. *The Dahlia in Australia*. 122 p. Whitcombe & Tombs, Ltd.: Melbourne. 1920.—This volume deals with the evolution of this popular flower, its introduction, a description of types, and with Dahlia species, together with much cultural information.—J. H. Gourley.

4090. PURPUS, A. *Winterharte Selaginellen*. [Hardy Selaginellas.] Möllers Deutsch. Gärt. Zeitg. 38: 17-18, 29-30, 41-42. 4 fig. 1923.—The following species of *Selaginella* are mentioned as resistant to the winters in Germany: *S. helvetica* Lk., *S. denticulata* Link. (not *S. denticulata* Hort.), *S. Douglasi* Spring., *S. mongolica* Rub., *S. Mariesii* Baker, *S. apus* Spring., *S. Ludiwiciana* A. Br., *S. nipponica* Franch et Sav., *S. Savatieri* Baker., *S. borealis* Spring., *S. selaginoides* Link., and *S. rupestris* Spring.—J. C. Th. Uphof.

4091. PYLE, ROBERT. *How to grow roses*. 14th ed., 189 p., 15 color pl., half-tones, line drawings. Conrad & Jones Co.: West Grove, Pennsylvania, 1923.—In this attractive treatise on the culture of the rose, an appeal is made to interest all in rose growing and explicit information is given on choice of varieties and garden operations. The amateur and rose fancier will find the groupings of roses for special purposes a convenient feature of the work. The following chapter headings indicate the nature of the contents: Comradeship of the rose; where on my place can I grow roses; how to choose the choicest; universal favorites and special purpose varieties; laying the foundation; planting; rose-time; protecting the roses; pruning for abundance; the best roses for America; selections by experts for special sections; extending the dominion of the rose; hybridizing; own-root and budded or grafted roses; how to preserve rose fragrance; roses for forcing or indoor bloom. In the appendix are given: Rose-lovers' calendar of operations; rose synonyms; analysis of species; and bibliography.—J. H. Gourley.

4092. ROUX, J. *Echinopsis Eyriesii et multiplex*. Rev. Hort. 94: 29-30. 1922.—This is a spontaneous hybrid intermediate between the parents in several characters.—E. J. Kraus.

4093. SANDERS, THOMAS WILLIAM. *Rock gardens and alpine plants*. 3rd ed., 205 p., illus. (colored pl. and half tones). W. H. & L. Collingridge: London, 1922.—This is a complete guide to the construction of large and small rockeries, the cultivation of alpine plants, and use of water gardens.—J. H. Gourley.

4094. STEIDEL, HEINR. *Clematis durch Stecklinge vermehrt*. [Clematis propagated from cuttings.] Möllers Deutsch. Gärt. Zeitg. 38: 42-43. 1 fig. 1923.—Clematis is usually propagated by grafting but several forms of the *lanuginosa*, *florida*, *patens*, *Jackmanni*, and *coccinae* classes can be propagated successfully from cuttings taken in July. After removing $\frac{2}{3}$ of the leaves of the cuttings the latter are put in a mixture of peat dust and sand, covered by a layer of washed sand and placed in a medium warm frame in a shaded and moist environment.—J. C. Th. Uphof.

4095. STURM, H. *Helleborus als winterblühende Blütenstaude*. [Helleborus as flowering herbaceous plants in winter.] Möllers Deutsch. Gärt. Zeitg. 38: 18-19, 42. 1923.—The following forms are suitable for forcing: *Helleborus abchasicus*, Mme. Tourtado, *H. colchicus*, *H. corsicus*, *H. guttatus*, *H. giganteus*, *H. Kochi*, and *H. lividis*. Three- to 4-year old plants should be transplanted with soil adhering to the roots and placed under glass in October. Flowers appear within a few weeks.—J. C. Th. Uphof.

4096. TOOLE, WILLIAM, SR. *Native plants of Wisconsin suitable for cultivation*. 54 p., frontispiece. Wisconsin State Horticultural Society: 1922.—This booklet includes an introduction by FREDERIC CRANFIELD and 5 separate papers by the author, as follows: Domesticating our native flowers; native shrubs; our native trees; cultivating our native ferns; and our native climbing vines.—J. H. Gourley.

4097. VALETON, TH. *Index Zingiberacearum quae anno 1919 in Horto Botanico Bogoriensi coluntur.* [Index of Zingiberaceae cultivated in 1919 in the Botanic Garden at Buitenzorg.] Bull. Jard. Bot. Buitenzorg III, 1: 321-326. 1919.

4098. WEBSTER, ANGUS DUNCAN, *London trees.* xii + 218 p., 32 fig. Swarthmore Press: London, 1922.—An account is presented of the trees that succeed in London, with descriptive notes and historical incidents. A spirit has grown up in the city to plant and preserve beautiful trees and special provision is made to protect them.—*J. H. Gourley.*

4099. WUST. *Schönblühende Stauden für den Imkergarten, Siedlungen und Vorgarten.* [Beautiful blooming shrubs for the bee garden, settlement, and flower garden.] Markische Bienenzeitg. 13: 43. 1923.—Descriptions are given of shrubs of varying heights especially suited to home planting.—*M. G. Dadant.*

VEGETABLE CULTURE

4100. BECKEL. *Sortenanbauversuch mit Rotkohl im Jahre 1922.* [Variety test of red cabbage in 1922.] Mitteil. Deutsch. Landw. Ges. 38: 100-101. 1923.—Tests were conducted with 5 varieties on 5 fields. In taste and odor all scored alike but in color Zittauer giant scored highest and Holland blood red lowest. As a result of the trials the author ranks Westfalia first, Danish stonehead second, and Zittauer giant last, with Holland blood red and Othello near the end of the list.—*A. J. Pieters.*

4101. BECKEL. *Sortenanbauversuche mit Tomaten im Jahre 1922.* [Variety tests with tomatoes in 1922.] Mitteil. Deutsch. Landw. Ges. 38: 123-124. 1923.—In this test with 4 varieties on 5 experimental fields the variety Danish Export produced the best fruit.—*A. J. Pieters.*

4102. DAVIDSON, H. C. *Vegetable culture: A practical manual.* viii + 144 p. C. Lockwood & Son: London, 1922.—This book is an attempt to answer many questions that have come to the author in his correspondence. He outlines his own practices and gives his reasons for them. Special mention is made of trenching and manuring; use of the hoe to destroy weeds and keep the soil in good tilth; use of lime to correct acidity and also for the control of club root of Cruciferae. The volume contains good practical directions throughout.—*J. H. Gourley.*

4103. HOLT, P. *Cantaloupes in Imperial Valley.* Amer. Bee Jour. 62: 379. 1922.

4104. ISBELL, C. L., and W. D. KIMBROUGH. *Use of wooden constructed fire heated hot beds for production of sweet potato plants.* Alabama Agric. Exp. Sta. Bull. 217. 6 p., 2 fig. 1922.—The authors give directions for construction of trench and broad types of hot beds and recommendations for their operation.—*W. A. Gardner.*

4105. LEIJS, J. J. *Zoete pataten.* [Sweet potatoes.] West Indië 4: 136-141. 1919.—A description of sweet potato culture in Surinam is given. The variety Blauwkop (Bluehead), which originated from the White Bermuda is of good quality, but does not yield well. Smitranken is also of good quality and is now being tested for productivity.—*J. C. Th. Uphof.*

4106. WEIRUP. *Anbauversuche mit Bohnen im Jahre 1922.* [Tests of beans in 1922.] Mitteil. Deutsch. Landw. Ges. 38: 63-66. 1923.—This report covers the performance of 3 varieties of green pole, 2 of wax pole, and 4 of wax bush beans. The pole wax variety Goldkrone yielded heaviest, all pole varieties outyielding the bush varieties.—*A. J. Pieters.*

4107. WEIRUP. *Anbauversuche mit Erbsen im Jahre 1922.* [Variety tests of peas in 1922.] Mitteil. Deutsch. Landw. Ges. 38: 80-82. 1923.—A detailed report is given of the performance of 4 varieties of garden peas on 5 experimental fields, the variety Moringia receiving the highest score.—*A. J. Pieters.*

4108. WEIRUP. *Sortenwahl beim Gemüsebau*. [Selecting varieties for vegetable culture. *Mittel. Deutsch. Landw. Ges.* 37: 763-764. 1922.—The author gives a list of desirable varieties of peas, beans, carrots, cabbage, and onions.—A. J. Pieters.

4109. ZIMMERLEY, H. H. *Cabbage strain tests*. *Virginia Truck Exp. Sta. Bull.* 37-38. 211-220. 1922.—Strains of Early Jersey Wakefield in 1920 and 1921 yielded 6.13-9.9 and 6.66-9.87 tons per acre respectively. Early cuttings in 1920 ranged from 0.13 to 4.53 and in 1921 from 0.9 to 5.63 tons per acre. Results show a big variation in total yield and production of early maturing heads from seed obtained from different sources. Strains of Charleston Wakefield in 1920 yielded 7.16-11.9 tons per acre, and in 1921, 10.6-14.22. Early cuttings in 1920 varied from 0.0 to 1.93 tons and in 1921 from 0.4 to 3.50 tons per acre. In 1921 premature seed stalk production in fall-planted Early Jersey Wakefield varied in different strains from 4.7 to 25.3 per cent and in the Charleston Wakefield from 14 to 28 per cent. "In the four earliest lots of Early Jersey Wakefield an average of 10.9 per cent of the plants went to seed as compared with 21.7 per cent in the four latest headings lots. . . . The plants which form a small compact head early in the season are less likely to seed prematurely than those which are somewhat open headed and leafy."—H. A. Jones.

HORTICULTURE PRODUCTS

4110. ANONYMOUS. *Over het gebruik van koffiepulp*. [Concerning the use of coffee pulp.] *West Indië* 6: 24-27. 1921.—Use of coffee pulp as (1) manure, (2) fuel, and (3) in the manufacture of alcohol is advised.—J. C. Th. Uphof.

4111. ALLEN, W. J., and S. A. HOGG. *The drying of prunes, currants, sultanas, and raisins*. *Agric. Gaz. New South Wales* 34: 135-138. 1923.

4112. AZOULAY, LÉON. *Le commerce et l'industrie des champignons secs en France et à l'étranger*.—Mesures à prendre pour prévenir les empoisonnements qu'ils peuvent causer. [The dried mushroom trade in France and elsewhere.—Precautions necessary to prevent poisoning.] *Bull. Trimest. Soc. Mycol. France* 38: 117-122. 1922.—The report of a committee regarding the preparation and sale of dried mushrooms is given.—D. S. Welch.

4113. AZOULAY, LÉON. *Proposition de loi ayant pour objet de prévenir les empoisonnements dus aux champignons mis en vente et à ceux cueillis par les particuliers*. [Legislation for the prevention of poisoning by mushrooms placed on sale or collected for individual use.] *Bull. Trimest. Soc. Mycol. France* 38: 109-116. 1922.—Information is included as to the extent and seriousness of mushroom poisoning, methods of prevention by public advertising, inspection, sales regulation, licences, and other means of protecting the public. The text of the proposed law is given.—D. S. Welch.

4114. GEORGI, C. D. V. *Oil from Aleurites species*. *Malayan Agric. Jour.* 10: 202-205. 1923.—The very hard nut of *Aleurites moluccana* may be most conveniently cracked by heating at 130-140°C. for 1 hour and then soaking in cold water. The yield of oil is given, also its constants.—I. H. Burkill.

4115. GEORGI, C. D. V. *Some Malayan oils and fats of minor importance*. *Malayan Agric. Jour.* 10: 222-227. 1923.—This gives the amount of oil and its constants in seed of *Bertholletia excelsa*, *Calophyllum inophyllum*, *Croton tiglium*, *Nephelium mutabile*, and *N. lappaceum*, locally produced.—I. H. Burkill.

4116. POWER, FREDERICK B., and VICTOR K. CHESNUT. *Examination of authentic grape juice for methyl anthranilate*. *Jour. Agric. Res.* 23: 47-53. 1923.—This ester is found in all varieties examined which are of *labrusca* origin and also in hybrid varieties in which this species predominates. Juices from varieties of *Vitis rotundifolia* from southern U. S. A., from *V. vinifera* from California, and from 1 sample of juice of *V. bourquiniana* did not have the ester.—D. Reddick.

4117. THOMMEN, GUSTAVE. Notes on the fern leaf industry. Amer. Fern Jour. 12: 122-125. 1922.—Fern leaves are collected in the fall and stored in cold frames or refrigerating places at a temperature of 31-32°F. Before they reach the market there is often a loss of 50-75 per cent, the cause of which is not understood.—*F. C. Anderson.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 3749, 3766, 3816, 3829, 3841, 3908, 3931, 3967, 4073, 4255, 4342, 4349, 4352, 4397, 4402, 4511, 4568, 4571, 4575, 4584, 4603, 4666, 4715)

4118. ALBEGGIANI, ELISABETTA. Misure ed osservazioni comparative sullo sviluppo in superficie degli organi fogliari e radicali. [Comparative measurements and observations on development of leaf and root systems.] Bull. R. Orto Bot. Palermo 2:157-170. 1921.—The extent of leaf and root surfaces was estimated for a number of plants of different species (*Urtica dioica*, *Tropaeolum majus*, *Helianthus annuus*, *Chenopodium album*, *Ricinus communis*, *Portulaca oleracea*, *Phaseolus vulgaris*, *Mercurialis annua*, etc.). Results indicated that the leaf surface is usually greater than that of the roots, and sometimes twice as great. The two tend to be equal when plants are young, but with maturity the leaf surface increases more rapidly than that of the roots.—*Edith K. Cash.*

4119. BAILEY, IRVING W. The anatomy of certain plants from the Belgian Congo, with special reference to myrmecophytism. Bull. Amer. Mus. Nat. Hist. 45: 585-621. Pl. 30-45. 1922.—Studies were made of *Vitex Staudii*, *Curiera* sp., *Platonia Laurentii*, *P.* sp., *Barteria fistulosa*, *B. dewevrei*, and *Sarcocephalus* sp.—The food of twig-inhabiting ants is described. Theories of myrmecophily and myrmecophytism are discussed, with the following conclusion: "Certain plants tend—for reasons which are at present obscure—to form extrafloral nectaries, food-bodies, prostomata, saccate leaves, fistulose branches, and other pseudodomatia, etc. In many cases, but by no means in all, these structural modifications of plants are taken advantage of by ants in their search for food and domatia. The myrmecophytic relationship which results is purely a case of parasitism in which all the advantage lies with the ants."—The origin of pseudo-gall forming habit is discussed.—*Frank E. Lutz.*

4120. BAURE, RAPHAEL. Entwicklungsgeschichtliche Untersuchungen an Polygonaceenblüten. [Development of the flower in the Polygonaceae.] Flora 115: 273-292. Pl. 2-8. 1922.—The floral plan of the Polygonaceae is 5-merous, not 3-merous. It is doubtful whether the Eriogoneae should be classed with the Polygonaceae.—*A. G. Stokey.*

4121. BECQUEREL, PAUL. La théorie de meriphyte devant les phénomènes de l'ontogénie vasculaire. [The theory of the meriphyte in the light of the phenomena of vascular ontogeny.] Compt. Rend. Acad. Sci. Paris 175: 233-235. 1922.—The author discusses the validity of Chauveaud's theory of vascular evolution. He supports the conclusions of Chauveaud as based on many species of the higher plants, and criticizes Bugnon for confining his studies to a single species.—*C. H. Farr.*

4122. BÖNING, KARL. Ueber den inneren Bau horizontaler und geneigter Sprosse und seine Ursachen. [The inner structure of horizontal and bent shoots and its causes.] Ber. Deutsch. Bot. Ges. 40: 279-282. 1922.—This is a report of observations upon anatomical differences in the tissues produced in eccentric radial growth of horizontal shoots of many herbaceous and woody plants. The author suggests that the unequal growth on the upper and lower side of shoots is due to mechanical stretching on the upper side, and pressure on the lower side. Any difference on the 2 sides of the shoot is usually due to differences in the xylem elements, which have slightly lignified and much thickened walls on the upper side, and the reverse on the lower side. Eccentric radial growth was found most commonly in trees and least commonly in herbs.—*W. C. Muenscher.*

4123. BOUVRAIN, GEORGES. Sur l'évolution vasculaire dans la *Mercuriale*. [On the vascular development of *Mercurialis*.] *Compt. Rend. Acad. Sci. Paris* 175: 380-382. 1922.—The author defends the interpretation of Chauveaud, as opposed to that presented by Bugnon [see Bot. Absts. 12, Entries 4125, 4126, 4127, 4129].—C. H. Farr.

4124. BRUYNE, C. DE. Idioblastes et diaphragmes des *Nymphéacées*. [Idioblasts and diaphragms of the *Nymphaeaceae*.] *Compt. Rend. Acad. Sci. Paris* 175: 452-455. 1922.—*Nuphar luteum*, *Nymphaea alba*, *N. lotus*, and *Victoria regia* were studied. Contrary to the report of certain authors, all of the *Nymphaeaceae* are provided with partitions in the aeriferous canals, either in all parts or only in the root. The idioblasts are branching sclerenchymatous cells.—C. H. Farr.

4125. BUGNON, P. L'organisation liberoligneuse chez la *Mercuriale* reproduit-elle une disposition ancestrale? [Is the fibro-vascular organization of *Mercurialis* an ancestral arrangement?] *Compt. Rend. Acad. Sci. Paris* 174: 1484-1486. *Fig. 1 (i-iv)*. 1922.—A continuation of a previous study [Ibid. 174: 1194. 1922]. A study is made of the fundamental difference between the vascular organization at the base of the cotyledon and at the base of the vegetative leaves. It is found in opposition to Chauveaud, that the 2 regions are identical in their principal characteristics; differences are of secondary importance.—C. H. Farr.

4126. BUGNON, P. Sur l'accélération basifuge dans l'hypocotyle. [The basifugal acceleration of the hypocoty.] *Compt. Rend. Acad. Sci. Paris* 175: 43-45. 1922.—Chauveaud's interpretation [see Bot. Absts. 12, Entry 4129] of the anatomy of the hypocotyl of *Mercurialis* as opposed to the author's interpretation is discussed [see preceding entry]. It is concluded that the basifugal acceleration theory is based on the postulate of the initial continuity of the embryonic conductive apparatus. It does not explain the character common to the centripetal and centrifugal protoxylem. Certain vessels in the hypocotyl region are destroyed, in the course of germination, by the intercalary growth of the region. [See also Bot. Absts. 12, Entry 4123].—C. H. Farr.

4127. BUGNON, P. Sur la différenciation vasculaire basipète pour toutes les traces foliaires chez la *Mercuriale*. [On the basipetal vascular differentiation of all the foliar traces in *Mercurialis*.] *Compt. Rend. Acad. Sci. Paris* 175: 897-899. 7 *fig.* 1922.—Figures and descriptions are given of the leaf traces at 6 levels. The author regards Chauveaud's theory [see Bot. Absts. 12, Entry 4129] of basifugal acceleration as unnecessary to explain the basipetal vascular differentiation of the hypocotyl of *Mercurialis*. [See also Bot. Absts. 12, Entry 4123].—C. H. Farr.

4128. BUGNON, P. Sur la position systématique des *Euphorbiacées*. [On the systematic position of the *Euphorbiaceae*.] *Compt. Rend. Acad. Sci. Paris* 175: 629-632. *Fig. 1-2*. 1922.—This family is placed by some in the *Apetalae* next to the *Urticales*, and by others in the *Dialypetalae* next to the *Malvales*. Wettstein considers it transitional between the *Apetalae* and the *Dialypetalae*. In embryological characters, especially the venation of the cotyledons, the *Euphorbiaceae* seem to be closely related to the *Sterculiaceae*, a family of the *Malvales*.—C. H. Farr.

4129. CHAUVEAUD, GUSTAVE. Les principales variations du développement vasculaire dans les premières phyllorhizes des phanérogames ne sont pas déterminées par l'accroissement intercalaire. [The principal variations in the vascular development of the primary phyllorhiza of phanerogams are not determined by intercalary growth.] *Compt. Rend. Acad. Sci. Paris* 174: 1487-1489. 1922.—A study was made of the vascular variations in parts of the seedlings of *Ricinus* and *Mercurialis*. In *Ricinus* the basifugal accelerations are more marked than in *Mercurialis*.—C. H. Farr.

4130. COSTANTIN, J. Sur les croix de Malte présentées par les bois soumis à des traumatismes. [The Maltese cross seen in wood after wounding.] *Compt. Rend. Acad. Sci. Paris*

174: 1313-1316. 1922.—This phenomenon is most evident in chestnut, but also in certain species of *Acer*, *Staphylea*, black alder, dogwood, oak, ash, and service-tree. Advantage is taken of it in treating wood preparatory to making canes, pen holders, and similar articles. A large number of superficial cicatrices of the cortex are made Mar. 15-Apr. 15. The pattern of the section varies with the manner of making the cuts and the kind of wood.—C. H. Farr.

4131. DENHAM, H. J. The structure of the cotton hair and its botanical aspects. British Cotton Indust. Res. Assoc. Shirley Inst. Mem. 1: 87-100. 1922. [See Bot. Absts. 12, Entry 537.]

4132. FISCHER, HUGO. *Anemone alpina* L. mit monstrosen Blütenhüllblatt. [*Anemone alpina* L. with an abnormal perianth lobe.] Ber. Deutsch. Bot. Ges. 37: 476-478. Fig. 1. 1919.—An abnormal perianth lobe of *Anemone alpina* is described. The possible origin of perianth lobes from green leaves is discussed.—W. C. Muenscher.

4133. GANDRUP, JOHANNES. Over den steencellenring in de schors van Hevea. [The stone-cell ring in the cortex of Hevea.] Arch. Rubbercult. 5: 465-471. 1921.—The stone-cell ring develops from, and replaces, a ring of bast fibers.—C. D. La Rue.

4134. GANDRUP, JOHANNES. Over der kurklaag van Hevea schors. [The cork layer of Hevea bark.] Arch. Rubbercult. 5: 389-396. 1921.—The method of formation of cork is discussed. Tissues of the bark affected with brown bast disease will not be cut off by cork formation.—C. D. La Rue.

4135. GATIN, C. L. Première contribution à l'étude de l'embryon et de la germination des Aracées. [Embryo and germination in the Araceae.] Ann. Sci. Nat. Bot. X, 3: 145-169. Pl. 1-10. 1921.—Ten genera of the family are considered. The embryo is an undifferentiated proembryonal mass in *Caladium*, but more or less differentiation is shown in other genera. The endosperm is lacking in the mature seed in some genera. The vascular tissue is described as showing much variation in form. The primary root of the seedling often fails to develop, its place being taken by secondary roots, which may be formed before the maturity of the seed. Polyembryony, or at least the production of more than 1 embryonal axis in a single seed, is noted in *Aglanema* and *Dieffenbachia*.—Paul Weatherwax.

4136. GEISENHEYNER, L. Ueber eine monströse *Linaria vulgaris*. [A monstrosity in *Linaria vulgaris*.] Ber. Deutsch. Bot. Ges. 37: 479-484. Fig. 1-2. 1919.—The flower and inflorescence is described. [See also Bot. Absts. 12, Entry 4138.]-W. C. Muenscher.

4137. GERTZ, OTTO. Ueber septierte Stomazellen. [Septate guard cells.] Ber. Deutsch. Bot. Ges. 37: 329-334. Fig. 1-16. 1919.—Stomata with more than 2 guard cells and other stomatal abnormalities are described and illustrated for a number of plants.—W. C. Muenscher.

4138. GRAF, JACOB. Eine abnorme Blütenbildung bei *Linaria vulgaris*. [An abnormal flower structure in *Linaria vulgaris*.] Ber. Deutsch. Bot. Ges. 37: 485-489. Pl. 7. 1919.—A study of the structure of the abnormal flowers of *Linaria vulgaris* described by Geisenheyner [see Bot. Absts. 12, Entry 4136] is reported.—W. C. Muenscher.

4139. GYORFFY, I. Keimlinge der Weissstanne mit Doppelblättern. [Seedlings of white fir with double leaves.] Ber. Deutsch. Bot. Ges. 39: 123-125. Fig. 1. 1921.—Four seedlings of *Abies alba* with double or forked cotyledons are described and pictured.—W. C. Muenscher.

4140. HASTINGS, G. T. Rudimentary sporangia on the royal fern. Torrey 23: 10. 1923. In May, 1922, many plants of *Osmunda regalis* showed a tendency for all fronds to be fertile, over $\frac{1}{2}$ of the plants bearing rudimentary sporangia on the upper pinnae of the sterile fronds. These were about $\frac{1}{3}$ the size of normal sporangia, and were in all stages of development. Later in the season no sporangia were observed.—J. C. Nelson.

4141. HEIMLICH, LOUIS F. *Peloria* in *Linaria* and other plants. *Proc. Indiana Acad. Sci.* 1921: 111-116. *Fig. 1-12.* 1922.—On more than a dozen plants of *Linaria vulgaris* Hill all flowers had 5 spurs instead of 1. Others noted were *Delphinium belladonna*, with 1 sepal divided and leaflike; *Calendula officinalis* L., with some of the small flowers changed into small heads on long pedicels; *Picea excelsa* L., which produced from a terminal bud a cone containing small loose scales with large microsporangia at the base and a middle zone of sterile scales resembling megasporophylls.—*F. C. Anderson.*

4142. HEINRICHER, E. Ueber die Blüten und die Bestäubung bei *Viscum cruciatum* Sieb. [The flowers and pollination of *Viscum cruciatum*.] *Ber. Deutsch. Bot. Ges.* 40: 168-173. *Fig. 1-2.* 1922.—The general structure of the small and inconspicuous flowers, the failure to find nectar, and the echinate but not sticky pollen in *Viscum cruciatum*, all suggest wind pollination rather than insect pollination.—*W. C. Muenscher.*

4143. HERZFELD, STEPHANIE. *Ephedra campylopoda* Mey. *Morphologie der weiblichen Blüte und Befruchtungsvorgang.* [Ephedra campylopoda Mey. Morphology of the female flower and fertilization.] *Denkschr. Akad. Wiss. Wien Math.-Nat. Kl.* 98: 243-268. *Pl. 1-2.* 1922.—This species has 2 kinds of female flowers—those borne upon strictly female plants and having only ovules, and those in which the ovulate flowers have some stamens below the ovule. In both, a ring of tissue develops at the base of the nucellus, but subsequently an integument which is prolonged into the long micropyle characteristic of Gnetales develops in the normal flower, while in the modified female flower the development of the integument is more or less abortive or distorted. The ring of tissue below the integument is neither sporophyll, integument, nor perianth, but an organ "sui generis" and homologous with the actinomorphic fertile scales (Fruchtschuppen) of the Taxaceae.—The development of the female gametophyte is normal. All the cells of the upper layer are potential archegonium initials, but the usual numbers developing are 3-5 with 1-6 as the limits. No wall is formed between the ventral canal nucleus and the egg, not even spindle fibers being distinguishable.—The pollen grain at the shedding stage contains 1 prothallial cell, 2 "wall cells," a tube cell, and an "antheridial" cell which, later, gives rise to 2 male cells. One of the male nuclei fuses with the ventral canal nucleus, and the other unites with the egg nucleus. This is described as double fertilization. The author believes that such fusions, described by several students of gymnosperms as occasional occurrences, belong to the same category and constitute a step toward true double fertilization. She found no embryo developing as a result of the fertilization of the ventral canal nucleus.—The reduced condition of the female gametophyte of *Ephedra*, when compared with that of other Gnetales, indicates the way to the origin of the embryo-sac of angiosperms.—The chromosome number of the gametophyte is 6 and that of the sporophyte, 12—just 1/2 the number which is almost universal in gymnosperms.—*Charles J. Chamberlain.*

4144. KOSTYTSCHEW, S. Der Bau und das Dickenwachstum der Dikotylenstämme. [The structure and growth in thickness of the stem of dicotyledons.] *Ber. Deutsch. Bot. Ges.* 40: 297-305. *Fig. 1-10.* 1922.—The arrangement of the procambium determines the shape of the stem in dicotyledons. A continuous ring of procambium develops into a solid cylinder of wood and phloem; isolated groups of procambium develop into distinct vascular bundles. Only the earliest formed cambium ring develops wood and phloem; the interfascicular cambium developed in a few plants produces only parenchyma, which is not identical with the medullary ray tissue formed in a continuous woody ring. The leaf traces in a young cylinder are easily distinguished from the true vascular bundles. These leaf traces are independent morphological units, being purely the result of a correlation between leaf and stem development. The strips of procambium between each leaf trace are often mistaken for interfascicular cambium, giving rise to serious errors.—*C. L. Wilson.*

4145. LA ROSA, ANGELINA. Il periderma picciolare di alcune specie di *Ficus*. [The petiolar periderm of some species of *Ficus*.] *Bull. R. Orto Bot. Palermo* 2: 149-156. 1921.—The species studied, growing in the Palermo Botanical Garden, are as follows: *Ficus saus-*

sureana, *F. leucontathoma*, *F. quercifolia*, *F. glomerata*, *F. polioarpa*, *F. Sycomorus*, *F. Vagneri*, *F. Neumannii*, *F. gigantea*, *F. salicifolia*, *F. laurifolia*, *F. capensis* and *F. vasta*. The periderm of the leaf petioles in every case was found to develop from the layer of cells immediately beneath the epidermis, the brown, withered walls of the epidermal cells persisting on the surface. The periderm of the branches is formed at the same time or slightly later than that of the petioles, and likewise originates from the subepidermal tissue, but continues to increase in thickness after the leaves have fallen. The early formation of periderm in the leaf petioles of exotic species of *Ficus* serves to limit transpiration and aid in protecting the leaf tissues from drying.—*Edith K. Cash*.

4146. LAVIALLE, P., et J. DELACROIX. *Laparoï du pistil et du fruit dans le genre Euphorbia*. [The wall of the pistil and the fruit of the genus *Euphorbia*.] *Compt. Rend. Acad. Sci. Paris* 175: 179–181. 1922.—Detailed descriptions of these organs are given. In the structure of the ovary and fruit, the *Euphorbiaceae* are believed to show a relationship to the *Malvaceae*, especially to the tribe *Bombaceae*. In like manner they seem to be related to the *Rutaceae*.—*C. H. Farr*.

4147. MIRANDE, MARCEL. *Sur l'origine morphologique du liber interne des Nolanacées et la position systématique de cette famille*. [The morphological origin of the internal wood of the *Nolanaceae* and the systematic position of this family.] *Compt. Rend. Acad. Sci. Paris* 175: 375–376. 1922.—The vascular structure of 3 species of *Nolana* is described. In the characters here studied this family is more like the *Solanaceae* than the *Convolvulaceae*, and it is suggested that the family be placed between the *Boraginaceae* and the *Solanaceae*.—*C. H. Farr*.

4148. NEGER, F. W. *Beiträge zur Kenntnis des Baues und der Wirkung der Lentizellen II*. [Structure and function of lenticels II.] *Ber. Deutsch. Bot. Ges.* 40: 306–313. *Fig. 1–2*. 1922.—In this 2nd paper [see *Bot. Absts.* 9, Entry 872] the author describes the lenticels on the aerial roots of *Philodendron* and discusses the literature. Lenticel-like intumescences on the lower surface of the phyllodia of species of *Acacia* are interpreted as adaptations which function as stomata in the exchange of gases under greenhouse conditions.—Infections were produced through lenticels on twigs of *Acer* and *Aesculus* which had been inoculated with pure cultures of conidia of *Nectria cinnabarina*.—*W. C. Muenscher*.

4149. NICOLAS, G. *Contribution à l'étude des synanthies*. [Contribution to the study of synanthly.] *Rev. Gén. Bot.* 35: 49–56. 1923.—Synanthly as found in *Narcissus Tazetta* was studied morphologically and anatomically. The author is of the opinion that synanthly may be caused by deficient nutrition.—*J. C. Gilman*.

4150. RIMBACH, A. *Lebensweise von Chloraea membranacea*. [Seasonal growth of *Chloraea membranacea*.] *Ber. Deutsch. Bot. Ges.* 40: 322–326. *Fig. 1–6*. 1922.—The author describes the growth of this orchid from seed sown in flower pots. Under natural conditions in Uruguay, the leaves appear in March on the rhizome which has remained dormant during the warm, dry January and February. In August the leaves begin to die and by October the inflorescence appears from among the dying leaves. Blossoming begins in November and lasts about 3 weeks. After the fruit matures and the seed are disseminated, in December, the fruit stalk drops off and the plant remains dormant, without aerial organs, through the summer.—*W. C. Muenscher*.

4151. SCHÜRHOFF, P. N. *Zur Phylogenie des angiospermen Embryosacs*. [Phylogeny of the embryo-sac in angiosperms.] *Ber. Deutsch. Bot. Ges.* 37: 161–169. 1919.—Various views regarding the significance of the contents of the mature embryo-sac of angiosperms are discussed, but none offer any explanation of the derivation of this organ from the female haploid generation of gymnosperms. According to the author the egg corresponds to the egg of gymnosperms. One synergid is the homologue of the ventral canal cell; the other is a later delimited cell of the many-nucleate prothallium. The polar nuclei are the remains of the many-nucleated, cellular, undifferentiated prothallium. The antipodals correspond to the cellular prothallium of gymnosperms.—*W. C. Muenscher*.

4152. SCHÜRHOFF, P. N. Zur Polyembryonie von *Allium odorum*. [Polyembryony in *Allium odorum*.] Ber. Deutsch. Bot. Ges. 40: 374-381. 1923.—A large number of embryos occur in the antipodal end of many embryo sacs of *Allium odorum* which possess the diploid number of chromosomes, in contrast with the haploid condition present in the normal embryo-sac nuclei. These antipodal embryos are adventitious embryos originating from the vegetative budding of the outer layers of the inner integument of the nucellus.—M. E. Stratton.

4153. SOUÈGES, RENÉ. Embryogénie des Caryophyllacées. Les premiers stades du développement de l'embryon chez le *Sagina procumbens* L. [Embryogeny of the Caryophyllaceae. The early stages in the development of the embryo of *Sagina procumbens*.] Compt. Rend. Acad. Sci. Paris 175: 709-711. Fig. 1-18. 1922.—A figure of each successive cell-division is given accompanied by a careful description of each stage. [See also following entry.]—C. H. Farr.

4154. SOUÈGES, RENÉ. Embryogénie des Caryophyllacées. Les derniers stades du développement de l'embryon chez le *Sagina procumbens* L. [Embryogeny of the Caryophyllaceae. The later stages in the development of the embryo of *Sagina procumbens*.] Compt. Rend. Acad. Sci. Paris 175: 894-896. Fig. 19-34. 1922.—This continuation [see preceding entry] carries the embryo to the final stage, as it is found in the seed.—C. H. Farr.

4155. SOUÈGES, RENÉ. Embryogénie des Malvacées. Développement de l'embryon chez le *Malva rotundifolia* L. [Embryogeny of the Malvaceae. Development of the embryo of *Malva rotundifolia*.] Compt. Rend. Acad. Sci. Paris 175: 1435-1436. Fig. 1-14. 1922.—The author describes and figures the development of the embryo of this species. This is found to be absolutely identical with that of *Senecio vulgaris* and *Urtica pilulifera*.—C. H. Farr.

4156. SOUÈGES, RENÉ. Recherches embryogéniques sur l'*Hippuris vulgaris* L. [Embryological researches on *Hippuris vulgaris*.] Compt. Rend. Acad. Sci. Paris 175: 529-532. Fig. 1-17. 1922.—The development of the embryo of this plant is much like that of *Veronica arvensis*.—C. H. Farr.

4157. SPESSARD, EARL AUGUSTUS. Prothallia of *Lycopodium* in America II. *L. lucidulum* and *L. obscurum* var. *dendroideum*. Bot. Gaz. 74: 392-413. Pl. 16-18. 1922.—Prothallia of *L. lucidulum* were found in quantity at certain stations in Michigan. They occur in small patches from 1 of which 153 individuals were taken. The habitat is drier than that occupied by the adult sporophytes. The sporophytes migrate to moister conditions through gemmae originating from occasional survivals of egg-initiated sporophytes in wet years. Histological studies of the prothallia are presented. The prothallia are monoecious, the sex organs appearing in acropetal succession.—The prothallia of *L. obscurum* var. *dendroideum* are much rarer, only 37 being found here. They occur in soils very diverse with regard to humus content, but soils which the author believes to be slightly drier than those carrying the sporophytes. The antheridia, and to a less extent the archegonia, occur in unusually large masses, the excess size of which may be related to the influence of the symbiotic fungus which was noted to invade this region. In *L. lucidulum* spore-like bodies of an endophytic fungus are present in half of the cells, the other half carrying the mycelium. This condition does not obtain in *L. obscurum*, where all the cells bear mycelial material. The taxonomic position of the fungi is still in doubt but the writer regards them as Ascomycetes rather than Oomycetes, as others have heretofore done.—B. W. Wells.

4158. STOMPS, THEO. J. Blattbecher, Sprossbecher und Stengelbecher. [Leaf-pitchers, shoot-pitchers and stem-pitchers.] Ber. Deutsch. Bot. Ges. 40: 264-268. 1922.—A brief discussion is given of what appear to be misinterpretations of some of the author's views regarding the nature and origin of certain pitcher-like modifications of some plant organs.—W. C. Muenscher.

4159. VUILLEMIN, PAUL. *La petalosteme*. [The petalostem.] Compt. Rend. Acad. Sci. Paris 175: 553-531. 1922.—The portion of the flower which the petals and stamens comprise is termed the petalostem. It is considered to originate from the frond, rather than from the leaf, as do the sepals and floral bracts. Petals and stamens may intergrade, but their metamorphoses into sepals is regarded as illusory. An evolutionary series of floral types is given which sets forth the transformations of the petalostem.—C. H. Farr.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 3747, 3772, 3779, 3814, 4187, 4232, 4234, 4471, 4488, 4510, 4566, 4585, 4629, 4634, 4683, 4705, 4713)

4160. HAMEL, G. *Sur quelques particularités de la flore algologique de Saint-Malo*. [On certain particulars in the algal flora of Saint-Malo.] Compt. Rend. Acad. Sci. Paris 175: 1091-1093. 1922.—*Codium Bursa*, *Cladophora prolifera*, and *Solieria chordalis* are reported for this locality and their distribution is discussed. Certain other species are reported from this vicinity as their northern limit, such as *Gelidium sesquipedale*, *Gigartina Teedii*, *Polysiphonia subulifera*, and *Zanardinia collaris*.—C. H. Farr.

4161. NICOLAS, G. *Un nouvel hôte du Phyllosiphon Kühn*. [A new host for Phyllosiphon.] Compt. Rend. Acad. Sci. Paris 175: 46-47. 1922.—This siphonaceous alga is a parasite on the leaves of certain aroids. *Phyllosiphon Arisari* has been known to occur on 2 species of *Arisarum* and on *Arum maculatum*. It is now found in Algeria on *Arum italicum*. A description of the appearance of the parasite and the host is given.—C. H. Farr.

4162. PUYMALY, A. DE. *Adaptation à la vie aérienne d'une Conjuguée filamenteuse (Zygnema peliosporum Witttr.)*. [The adaptation to aerial life of a filamentous conjugate, *Zygnema peliosporum*.] Compt. Rend. Acad. Sci. Paris 175: 1229-1231. 1922.—This alga, resembling *Zygnema Ericetorum* var. *terrestre*, grows on the ground forming a webby structure. The filaments secrete a gelatin which agglutinates the threads together and effectively resists desiccation. Reproduction is by akinetes; zygospores are rare.—C. H. Farr.

4163. TAYLOR, WM. RANDOLPH. *Recent studies of Phaeophyceae and their bearing on classification*. Bot. Gaz. 74: 431-441. 1922.—After a review of recent work on the life histories of Phaeophyceae by Sauvageau, Drew, Killian, Williams, Kylin, Kuckuck, Pascher, and Ikari, the author proposes a classification of the group based on the newer morphological findings. The orders Phaeosporales and Cyclosporaes are retained. The former is divided into 3 suborders, (1) Ectocarpineae (8 families), with morphological alternation of similar generations shown or inferred to be present; (2) Dictyosiphonineae (1 family), with morphological alternation of dissimilar generations present or inferred, the sporophyte exceeding the gametophyte in size; (3) Cutlerineae (1 family), with morphological alternation of similar or dissimilar generations present, gametophyte, when different, larger than the sporophyte, growth trichothallic. The order Cyclosporaes is divided into 3 suborders each with one family: (1) Dictyotineae, with morphological alternation of similar generations; (2) Laminarineae, with morphological alternation of dissimilar generations, gametophyte smaller than the sporophyte; (3) Fucineae, with only cytological alternation of generations.—I. F. Lewis.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 3754, 3755, 3779, 4246, 4629, 4634, 4683)

4164. AMANN, J. *Fissidens Mnevidis* Amann, sp. nova. Rev. Bryologique 49: 51. 1922.—The new species described under the above name was based on material collected by P. Jaccard in the valley of the Nile, Egypt. It is assigned to the section *Bryoideum* C.M.—A.W. Evans.

4165. AMANN, J. *Le Cinclidotus danubicus* en Suisse. [*Cinclidotus danubicus* in Switzerland.] Rev. Bryologique 49: 49, 50. 1922.—The discovery of *Cinclidotus danubicus* Schiffner & Baumgartner, a species new to Switzerland, is announced on the basis of specimens collected by E. Seiger at Basel. The species is briefly characterized, and the cellular indices of the various European species of *Cinclidotus* are tabulated.—A. W. Evans.

4166. ANDREWS, A. LEROY. Additions to the bryophyte flora of Iceland. Bryologist 26: 4. 1923.—The author reports 1 hepatic and 2 mosses as additions to the list given by Hesselbo in the Bryophyta of Iceland [see Bot. Absts. 1, Entries 470, 1040].—E. B. Chamberlain.

4167. ANDREWS, A. LEROY. The status of *Gyroweis* in North America. Bryologist 25: 97-100. 1922.—*Gyroweis* as a generic name has no valid status as it is antedated by *Weisiodon* Schimp. *Gyroweis tenuis* Schimp. does not occur in North America, reports of it being due to errors in determination. *G. Barbula* (Schwaegr.) Par., *G. brevicaulis* (Hpe.) Broth., *G. obtusifolia* (Hpe.) Broth., and *G. barbulacea* (C. M.) Broth., all species of tropical America, do not belong in the genus, and their exact status is at present uncertain. If *Weisiodon* is extended beyond its original application, it should probably include *Dactylhymenium Pringlei* (E. G. Britton) Card. of Mexico, *Gyroweis boliviana* R. S. W. of the Andes, and *Didymodon topheus* (Brid.) Jur. of western North America.—E. B. Chamberlain.

4168. ANDREWS, A. LEROY. Two additions to the Bermuda flora. Bryologist 26: 6. 1923.—The author reports *Octoblepharum albidum* (L.) Hedw. and *Bryum murale* Wils. as additions to the flora of Bermuda and notes new localities for 2 other mosses and for 2 hepatics.—E. B. Chamberlain.

4169. BRITTON, ELIZABETH G. Notes on *Fissidens*, II. Bryologist 26: 1. 1923.—*Fissidens palmatus* (Sw.) Hedw. is apparently endemic in Jamaica and known only from the original collection. Material from St. Thomas and Cuba reported under the above name belongs to *Fissidens Kegelianus* C. M., a common species of subtropical and tropical America. The synonymy and distribution of the latter species are outlined.—E. B. Chamberlain.

4170. CONKLIN, GEO. HALL. Report of the Curator of the Hepatic Herbarium. Bryologist 26: 10-11. 1923.—In recapitulating the additions to the herbarium of the Sullivant Moss Society, the author mentions localities for a few uncommon hepatics.—E. B. Chamberlain.

4171. DISMIER, G. Note sur le *Zygodon conoideus* (Dicks.) Hook. et Tayl., d'après le travail M. N. Malta. [Note on *Zygodon conoideus*, based on the work of Mr. N. Malta.] Rev. Bryologique 49: 61-64. 1922.—The author reviews a recent paper by Malta on the distribution of *Zygodon conoideus* [see Bot. Absts. 11, Entry 2671] and cites the species from several additional localities in France, 7 different departments being represented. He calls particular attention to the propagula of *Zygodon*, as described by Malta, and emphasizes the importance of these organs in distinguishing closely related species.—A. W. Evans.

4172. Локтуровский, В. С. [DOCTUROWSKY, W. S.] Мхи торфяных болотъ Полѣсья Минской и Волынской губ. [The mosses of the peat bogs of Polesia in the Provinces Minsk and Wolyn.] Вѣстникъ торфяного Лѣла [Reports on Peat] 3/4. 1916. [With French summary.]—In this paper 111 species of mosses are listed, 23 belonging to the genus *Sphagnum*, and their distribution in various associations is described. The determinations were made by V. F. Brotherus and H. Lindberg.—W. S. Docturowsky.

4173. GARDET, G. Sur l'extension vers l'Est, d'une bryacée d'allure méridionale: *Conomitrium Julianum* Montagne. [On an extension toward the East of a bryophyte having a southern appearance: *Conomitrium Julianum*.] Rev. Bryologique 49: 65, 66. 1922.—The author records the discovery of the aquatic *Conomitrium Julianum* at Jussey (Haute-Saône) and at Voisy (Haute-Marne), these stations extending the known range of the species into the eastern part of France.—A. W. Evans.

4174. LOESKE, L. Haplolepideen und Diplolepideen in bryo-systematischer Beziehung. [Haplolepideae and Diplolepideae from the standpoint of moss taxonomy.] Bot. Archiv 4: 110-112. 1923.—The distinctions between the Haplolepideae and the Diplolepideae are based on differences in the peristome and were first pointed out by Philibert in 1884. In the typical Haplolepideae the peristome is single and each tooth is derived from 1 external row of cells and 2 internal rows; in the typical Diplolepideae the peristome is double and each tooth of the outer peristome is derived from 2 external rows and 1 internal row. In the author's opinion these distinctions have been much overrated by taxonomists, and peristomes of identical structure may sometimes be found in genera that would not be considered closely related, if their gametophytic characters were taken into consideration. Similarity in the structure of the peristome may therefore represent a convergence-phenomenon and have but little phylogenetic significance.—A. W. Evans.

4175. LORENZ, ANNIE. Some Hepaticae from Grand Manan N. B. Bryologist 26: 5. 1923.—A list of 25 species from the island of Grand Manan, New Brunswick, is given, the local distribution of each species being indicated. The report is based on a collection made in 1922 by W. R. Taylor and the only rarity included is *Diplophyllum albicans* (L.) Dum.—E. B. Chamberlain.

4176. NICHOLSON, W. EDW. Mosses and hepatics near Aviemore, East Inverness. Rev. Bryologique 49: 54-58. 1922.—The region reported upon was explored by the author and H. H. Knight during July, 1921. It is situated about midway between the east and west coasts of Scotland and is too dry to yield a full representation of the so-called Atlantic species, only 3 of which were collected. The mosses enumerated number 34 and the hepatics 58. Each species is accompanied by data regarding stations, and occasional critical remarks are interpolated.—A. W. Evans.

4177. PEARSON, WM. HY. Swiss hepatics. Rev. Bryologique 49: 59-61. 1922.—A small collection of Hepaticae made in July, 1922, by P. G. M. Rhodes in the St. Bernard region of Switzerland is reported upon. The species listed number 15 and are accompanied by full data regarding localities and occasionally by critical remarks. Under *Lophozia Lyoni* (Tayl.) Steph. the new variety *subaequiloba* Meylan is described.—A. W. Evans.

4178. TRABUT, L. Deux Funariacées nouvelles. [Two new Funariaceae.] Rev. Bryologique 49: 64, 65. 2 fig. 1922.—The author describes and figures 2 new Algerian mosses under the names *Funaria deserticola* and *Physcomitrium longicollum*, comparing the *Funaria* with *F. attenuata* and the *Physcomitrium* with *P. acuminatum*.—A. W. Evans.

4179. WILLIAMS, R. S. *Brachymenium condensatum*, sp. nov. Bryologist 26: 2-3. Pl. 1. 1922.—A new moss from Mexico is described and figured under the above name. The species was based on material collected by C. G. Pringle at Patzcuaro (No. 762) and is allied to *B. imbricatifolium* C. M.—E. B. Chamberlain.

4180. YUNCKER, T. G. Additions and corrections to the list of Indiana mosses. Proc. Indiana Acad. Sci. 1921: 155, 156. 1922.—The author's list of Indiana mosses has already been abstracted [see Bot. Absts. 10, Entry 997]. In the present paper 7 additional species and varieties for Indiana and 18 for Monroe County are enumerated, and 6 records in the earlier list are corrected. The additions are taken from a paper published by F. L. Pickett in 1915.—F. C. Anderson.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 3733, 3748, 3766, 3797, 3829, 4112, 4113, 4157, 4260, 4261, 4265, 4270, 4282, 4284, 4289, 4295, 4302, 4303, 4310, 4314, 4315, 4316, 4324, 4335, 4341, 4346, 4351, 4409, 4444, 4445, 4448, 4505, 4560, 4565, 4579, 4629, 4634, 4683, 4713)

FUNGI

4181. BALLINGS, MADELEINE. *Le Vermicularia herbarum*, parasite des Oeillets. [*Vermicularia herbarum* a parasite of carnation.] Bull. Soc. Path. Vég. France 9: 288-289. 2 pl. 1922.—*Vermicularia* killed leaves of *Dianthus caryophyllus* and formed conidia, pseudosclerotia, and a sterile stroma; the similarity of this stroma to that of *Microsticta* is emphasized.—J. Dufrénoy.

4182. BATAILLE, F. Flore analytique et descriptive des Tuberoidees de l'Europe et de l'Afrique du Nord. [Analytical and descriptive flora of the Tuberoideae of Europe and North Africa.] Bull. Soc. Mycol. France 37: 155-207. 1921.—The author presents descriptive keys and bibliographical notes regarding the Tuberoideae of Europe and North Africa. No new names are introduced.—C. W. Dodge.

4183. BEZSSONOFF, N. Über die Züchtung von Pilzen auf hochkonzentrierten rohrzuckerhaltigen Nährböden und über die Chondriomfrage. [The growth of fungi on media containing a high concentration of cane sugar and a consideration of the chondriome question.] Ber. Deutsch. Bot. Ges. 37: 136-148. Pl. 1. 1919.—The development of the sexual stage in molds is stimulated by the presence of large quantities of cane sugar in the substratum. Under such conditions the chondriome material becomes more or less dispersed throughout the cytoplasm of the cell. The chondriome bodies disappear and the cytoplasm stains darker with nuclear stains.—D. S. Welch.

4184. BISBY, G. R. The literature on the classification of the Hysteriales. Trans. British Mycol. Soc. 8: 176-189. 1923.—There has always been a great deal of confusion in the classification and naming of the Hysteriales, the indication being that they form a transitional group between the Pyrenomycetes and Discomycetes. Attention is called to the need for further comparative and synthetic study in this group. The review of the literature is followed by a bibliography of 78 titles.—W. B. McDougall.

4185. BLUMER, SAMUEL. Beiträge zur Specialization der Erysiphe horridula Lév. auf Boraginaceen. [Specialization of *Erysiphe horridula* on Boraginaceae.] Jahrb. Phil. Fakultät II. Univ. Bern 2: 28-34. 1922. [See Bot. Absts. 12, Entry 588.]

4186. BROOKS, F. T., and C. G. HANSFORD. Mould growths upon cold store meat. Trans. British Mycol. Soc. 8: 113-142. Fig. 1-10. 1923.—Twelve distinct species of fungi, representing 7 genera, were found growing upon cold store meat. Two of these, *Sporotrichum carnis* and *Torula botryoides*, are described as new, and 1, *Wardomyces anomala*, is described as the type species of a new genus. Numerous species of *Cladosporium* are believed to be strains of *C. herbarum*, the fungus which causes the common "black spot" of meat. Some strains of *C. herbarum* develop from spores and make a considerable growth at -6°C . Some of the other molds develop slightly at this temperature and all grow readily at 0°C . or just above. It is further shown that the spores and young mycelia of some of these molds may retain vitality for more than 2 years at -6°C . The growth of all of these fungi is superficial, the mycelium penetrating not more than 4 mm. at most and the meat is not rendered unfit for food. Growth may be prevented "by controlling the temperature and humidity conditions in cold stores and by avoiding unduly prolonged storage."—W. B. McDougall.

4187. BURNHAM, STEWART H., and ROY A. LATHAM. The flora of the Town of Southold, Long Island, and Gardiner's Island, New York. (Third supplementary list.) *Torrey* 23: 3-9. 1923.—The list includes 3 species of gall-producing insects, 3 of Myxomycetes, 9 of Euphyceae, 1 of Phycomycetes, 17 of Pyrenomycetes, 8 of other Ascomycetes, 3 of Melanconiales, 17 of Sphaeropsidales, 1 of Ustilaginaceae, 8 of Pucciniaceae, 1 of Tremellaceae, 1 of Dacromycetaceae, 2 of Thelephoraceae, and 1 of Hydnaceae, with notes on habitat and distribution.—J. C. Nelson.

4188. CHAPMAN, A. C. The use of the microscope in the brewing industry. *Jour. Roy. Microsc. Soc. London* 1922: 261-263. 1922.—The microscope may be used in the study of types of yeast, in preparing pure line cultures, and in ascertaining freedom from bacterial infections.—Wm. Randolph Taylor.

4189. CHENANTAIS, J. E. Notice taxonomique sur le groupe *Melanomma*. [Taxonomic note on the group *Melanomma*.] *Bull. Trimest. Soc. Mycol. France* 38: 88-92. 1922.—In classifying the species of this group external or anatomical characters are of little value as are also biological characters. It is suggested that the only method applicable to such a group is, as already suggested by the author for the classification of *Lophiotrema*, the selection of a few important and well recognized forms, the arrangement of these in a series according to spore measurements, and the interpolation of all other forms into this series, considering the latter as synonyms.—D. S. Welch.

4190. COLLEY, REGINALD H., and MINNIE W. TAYLOR. Studies on the aecial stage of *Cronartium ribicola* and *Cronartium occidentale*. [Abstract.] *Phytopathology* 13: 46-47. 1923.

4191. CORBIÈRE, L. Note sur le *Boletus sphaerocephalus* Barla. [On *Boletus sphaerocephalus*.] *Bull. Trimest. Soc. Mycol. France* 38: 71-77. *Pl. 1 (col.)*. 1922.—The author has collected a fungus near Cherbourg which corresponds very closely to the description of the rare species *B. sphaerocephalus* Barla, never reported since its description in 1859. The fungus is redescribed.—D. S. Welch.

4192. CUNNINGHAM, G. H. Occurrence of apothecia of brown rot in New Zealand. *New Zealand Jour. Agric.* 25: 177. 1922.—The finding of apothecia of *Sclerotinia cinerea* is recorded.—N. J. Giddings.

4193. DAVIS, W. H. Germination of the spores of timothy smut (*Ustilago striaeformis* (Westd.) Niessel). [Abstract.] *Phytopathology* 13: 38-39. 1923.

4194. DICKSON, F., and W. R. FISHER. A method of photographing spore discharge from apothecia. *Phytopathology* 13: 30-32. *Fig. 1-2*. 1923.—A detailed description is given of the method used in securing an excellent photograph of spore discharge from the apothecia of *Sclerotinia libertiana* Fekl.—B. B. Higgins.

4195. DODGE, B. O. The distribution of the orange rust of *Rubus*. *Phytopathology* 13: 61-74. 1923.—Collections of the orange leaf rust on species of *Rubus* were made throughout the Eastern U. S. A. from North Carolina to Maine. The rust in each collection was determined by germinating the aeciospores. Both *Kunkelia nitens* (Schw.) Arthur and *Gymnoconia interstitialis* (Schl.) Lagh. were found on blackberries and dewberries throughout the territory covered. Only *Gymnoconia* was found on the black raspberry (*Rubus occidentalis*).—B. B. Higgins.

4196. DOSDOLL, LOUISE, and J. J. CHRISTENSEN. Variations in the length of spores of *Helminthosporium sativum* P. K. & B. under different conditions of growth. [Abstract.] *Phytopathology* 13: 50. 1923.

4197. ELLIOTT, JOHN A. The ascigerous stage of the sweet potato black-rot fungus. [Abstract.] *Phytopathology* 13: 56. 1923.—On the basis of morphological characters the fungus known as *Sphaeronema fimbriatum* (E. & H.) Sacc. is transferred to the Ascomycetes under the name *Ceratostomella fimbriata* comb. nov.—B. B. Higgins.

4198. FITZPATRICK, H. M. A survey of the evidence indicating that *Phytophthora* should be merged with *Pythium*. [Abstract.] *Phytopathology* 13: 34. 1923.

4199. FITZPATRICK, HARRY MORTON. Monograph of the Nitschkieae. *Mycologia* 15: 23-67. Pl. 1-7. 1923.—A revision of the species of *Nitschkia* and of several other genera hitherto not regarded as closely related to it or to each other has resulted in the tentative erection in the Sphaeriales of a new subfamily, **Nitschkieae**. The genera included, *Nitschkia*, *Calyculosphaeria* nom. nov. (*Winterella* Berl.), *Tympanopsis*, *Thaxteria* and *Acanthonitschkea*, agree strikingly in the external aspect of the perithecium, which is turbinate collapsing to cupulate. Superficial, brown, thick-walled hyphae characterized by a striking metallic iridescence are usually prominent. A stroma is absent in some forms and present in others. Of the 32 species previously included in *Nitschkia* (*Coelosphaeria*) only 3 are retained, a new species, *N. floridana*, being described. Thirteen species are definitely excluded from the whole subfamily, 9 are transferred to the related genera here treated, and 7 remain as doubtful due to unavailability of authentic material. The new name *Calyculosphaeria* is used to replace *Winterella* Berl. and *Winterina* Sacc., both of which are preoccupied. The species *Nitschkia calyculus*, *N. collapsa*, *N. pezizoidea*, *N. tristis*, and *N. Winteriana* are included in *Calyculosphaeria* on the basis of their uniseptate spores, and *C. macrospora* is described as new. The writer follows Starbäck in recognizing *Tympanopsis* for *Nitschkia euomphala*, and describes *Tympanopsis uniseriata* as new. The spores of *Thaxteria* are shown to be brown and transversely tri-septate. The species *T. didyma* and *T. leptosporoides* (Wint.) comb. nov. are included, the latter being the same as *Nitschkia rugulosa* and *Coelosphaeria leptosporoides*. In *Acanthonitschkea*, *A. macrobarbata* is described as new.—H. M. Fitzpatrick.

4200. GASSNER, GUSTAV. Ueber einen eigenartigen Uromyces auf *Passiflora foetida* L. [A peculiar Uromyces on *Passiflora foetida*.] *Ber. Deutsch. Bot. Ges.* 40: 64-69. Fig. 1-3. 1922.—*Uromyces Appelianus* n. sp. is described, and reported as forming galls on *Passiflora foetida* in Uruguay and Brazil.—W. C. Muenscher.

4201. GÄUMANN, ERNST. Ein kleiner Beitrag zur Pilzflora des Krakatau. [A small contribution to the fungus flora of Krakatau.] *Bull. Jard. Bot. Buitenzorg* III, 2: 8-9. Pl. 1. 1920.—Two new fungi are described and figured: *Macrophoma Arundinae* on *Arundina speciosa* Bl., and *Phyllosticta Tinisporae* on *Tinispora crispa* Diels.—Alfred Rehder.

4202. GÄUMANN, ERNST. Ueber *Coelographium aurantiacum*, n. g., n. sp. [On *Coelographium aurantiacum*.] *Bull. Jard. Bot. Buitenzorg* III, 2: 10-14. Pl. 2, 3. 1920.—Saccardo's section *Coelographium* of *Graphium* is elevated to generic rank with 2 species, *C. caviceps* (Oudem.) and *C. aurantiacum*.—Alfred Rehder.

4203. HÖHNEL F. VON. Fünfte vorläufige Mitteilung mycologischer Ergebnisse (Nr. 399-500). [Fifth preliminary report on mycological investigations.] *Ber. Deutsch. Bot. Ges.* 37: 153-161. 1919.—The list includes many genera and species with changes and corrections. The names of the following genera appear: *Hymenula*, *Psilonia*, *Leptothyrium*, *Actinopelte*, *Sirodochiella*, *Anomomyces*, *Sphaeria*, *Epictinium*, *Fusoma*, *Entylomella*, *Tubercina*, *Phacostilbella*, *Graphium*, *Sporocybe*, *Stromatostysanus*, *Stysanus*, *Phyllosticta*, *Napicladium*, *Fusicladium*, *Clasterosporium*, *Brachydesmium*, *Halotrichum*, *Coniothecium*, *Stigmopsis*, *Helminthosporium*, *Brachysporium*, *Oidium*, *Penicillium*, *Monilia*, *Amblyosporium*, *Acrothecium*, *Pleurothecium*, *Scolicotrichum*, *Passalora*, *Carlia*, *Azosma*, *Macrosporium*, *Heterosporium*, *Cordana*, *Cladosporium*, *Phragmitis*, *Pucciniopsis*, *Cyclogonium*, *Cladotrichum*, *Sarcinella*, *Cercospora*, *Ramularia*, *Physospora*, *Coniophora*, *Triposporium*, *Stigmatea*, *Venturia*, *Cerato-*

sporella, *Fusicladiella*, *Cercosporidium*, *Didymothamnium*, *Hormocladium*, *Stictochorella*, *Xyloma*, *Ascospora*, *Dothidea*, *Cheirpodium*, *Clasterisporium*, *Meliola*, *Bactrodesmium*, *Hy-menopodium*, *Phanerocoryneum*, *Apotemnium*, *Pestalozzina*, *Mastigosporium*, *Monothecium*, *Columnothyrium*, *Actinothyrium*, *Melampsora*, *Melanobasidium*, *Epochnium*, *Sporidermium*, *Phanerocorynella*, *Coccodinium*, *Sporidesmium*, *Thyrostroma*, *Thyrostromella*, *Stigmina*, *Puccinia*, *Stictochorella*, *Hemileia*, *Pseudopuccinia*, *Circinotrichum*, *Helicotrichum*, *Gyothrix*, *Campsotrichum*, *Tricholeconium*, *Sarcopodium*, *Conoplea*, *Botryotrichum*, *Ceratocladium*, *Ellisiella*, *Colletotrichum*, *Vermicularia*, *Steirochaete*, *Pestalozzia*, *Bartalinea* *Sphaeropsis*, *Strasseria*, *Phoma*, *Phomopsis*, *Diaporthe*, *Cytospora*, *Dilophospora*, *Robillarda*, *Marsonia*, *Kabatia*, *Neottiospora*, *Hysteropezizella*, *Hysterostegiella*, *Tiarosporella*, *Ciliochora*, *Plagiorhabdus*, *Sirosperma*, *Aposphaeria*, *Pyrenochaeta*, *Trichocicinnus*, *Chaetophoma*, *Desmopatella*, *Heterosphaeria*, *Dacryomyces*, *Ephelis*, *Balansia*, *Rhabdospora*, *Zythia*, *Pyrenopeziza*, *Scleroderris*, *Sclerochaetella*, *Septoria*, *Darluka*, *Botryella*, *Diplodothiella*, *Ceuthospora*, *Pestalozziella*, *Chaetospermum*, *Amphiciliella*, *Dendrodochium*, *Calostilbella*, *Calostilbe*, *Microcera*, *Corallomyces*, *Haplographium*, *Trematosphaeria*, *Odontotrema*, *Phragmonaevia*, *Naeviella*, *Pragmopara*, *Gelatinosporium*, *Cladsterigma*, *Micropera*.—D. S. Welch.

4204. HÖHNEL, F. VON. **Ueber Bau, Stellung und Nebenfrüchte von Lasiobotrys.** [Morphology, systematic position, and imperfect stages of Lasiobotrys.] Ber. Deutsch. Bot. Ges. 37: 103–107. 1919.—The genus *Lasiobotrys* Kunze is placed near *Trabutia* under the Dothideales. The genus is described and its morphology and relationship discussed. *Lasiobotrys Lonicerae* Kunze is provisionally broken up as follows (conidial stages in brackets): 1. *Lasiobotrys Lonicerae* Kunze [*Colletotrichella Xylostei* (Faut.) n. comb., syn. *Labrella Xylostei* Faut.]; 2. *L. Periclymeni* n. sp. [*Colletotrichella Periclymeni* (D.) v. H.]; 3. *L. latemarensis* n. sp. [*Kabatia Lonicerae* (Harkness) v. H., syn. *K. latemarensis* Bub.]; 4. *L. mirabilis* n. sp. [*Kabatia mirabilis* B.].—A more complete description of these species is not possible until mature ascospores are found.—W. C. Muenscher.

4205. JOHANN, HELEN. **Influence of temperature on the morphology of Fusarium spores.** [Abstract.] Phytopathology 13: 51. 1923.

4206. JORGENSEN, C. A. **Heleococcum aurantiacum n. gen. et n. spec.** Bot. Tidsskr. 37: 417–420. Fig. 1–2. 1922.—The author gives a taxonomic description of the fungus to substantiate his conclusion that it represents a new genus as well as a new species.—A. L. Bakke.

4207. KILLERMANN, S. **Neuer Fund einer Vibrissea in Deutschland.** [A Vibrissea new to Germany.] Ber. Deutsch. Bot. Ges. 39: 345–347. Fig. 1. 1921.—*Vibrissea turbinata* Phill. is reported from Germany apparently for the 1st time.—W. C. Muenscher.

4208. KIRBY, R. S. **Heterothallism in Ophiobolus cariceti.** [Abstract.] Phytopathology 13: 35. 1923.

4209. KLEBAHN, H. **Wirtswechsel und Spezialisierung des Stachelbeerrostes.** [Specialization and change of host in Ribes rusts.] Ber. Deutsch. Bot. Ges. 40: 104–111. 1922.—Infection experiments, with teleutospores of *Puccinia Carici* produced on *Carex* spp. with aeciospores from *Ribes grossularia*, resulted in abundant infections on *Ribes* but not a single infection on *Urtica dioica*. The author maintains that the 2 rusts forming aecia upon *Ribes* and *Urtica* respectively, are biologically distinct and that Eriksson has not removed the possibility of a mixture of these 2 forms when he secured infections on both *Ribes* and *Urtica* from teleutospores collected on *Carex* growing in the vicinity of both *Ribes* and *Urtica* plants. Experiments indicate that both rusts are specialized on certain sections of the genus *Carex*. The *Ribes* rust has become more or less specialized upon *R. grossularia* and *R. nigrum*.—W. C. Muenscher.

4210. LAIBACH, F. **Zur Kenntnis der Gattung Septoria.** [Concerning the genus Septoria.] Ber. Deutsch. Bot. Ges. 37: 245–249. 1919.—The author discusses the relationship between

Septoria and *Mycosphaerella*, and shows that some species of the latter may have an imperfect stage which is more like *Cercospora*. Biological specialization appears to exist in the genus *Septoria*.—D. S. Welch.

4211. MAINS, E. B. Observations concerning *Puccinia Pattersoniana* and *Puccinia Moreniana*. Proc. Indiana Acad. Sci. 1921: 133-135. Pl. 1, fig. A-B. 1922.—The pedicels of the teliospores of both species stain dark blue with chloral hydrate and iodine. It is thought that *Puccinia Pattersoniana* has its aecial stage on *Brodiaea*.—F. C. Anderson.

4212. MAINS, E. B., and H. S. JACKSON. Aecial stages of the leaf rust of barley, *Puccinia simplex*, and rye, *P. dispersa*, in the United States. [Abstract.] Phytopathology 13: 49-50. 1923.

4213. MAINS, E. B., and H. S. JACKSON. Strains of the leaf rust of wheat, *Puccinia tritici*, in the United States. [Abstract.] Phytopathology 13: 36. 1923.

4214. MAIRE, RENÉ, et E. CHEMIN. Un nouveau Pyrénomycète marin. [A new marine pyrenomycete.] Compt. Rend. Acad. Sci. Paris 175: 319-321. Fig. 1-4. 1922.—This parasite on the red alga *Dilsea edulis* is described and given the name *Mycaureola Dilseae*.—C. H. Farr.

4215. MAUBLANC, A. Les champignons comestibles et vénéneux. [Edible and poisonous fungi.] Encyclopedie Pratique du Naturaliste Vol. VIII. 110 p., 96 col. pl., 140 fig. P. Lechevalier: Paris, 1921.—This is a handbook to the more common mushrooms of France. Part I, general information: characteristics of fungi, geographical distribution and influence of climate and soil upon fungous flora; the natural habitat of fungi and the time of their appearance. Part II, classification of fungi: a brief characterization of Myxomycetes and Phycomycetes is followed by a more detailed account of the morphology and taxonomy of the Basidiomycetes and a somewhat less thorough treatment of the Ascomycetes. Keys to the important families and genera are given. Part III, edible and poisonous mushrooms: general characteristics of poisonous forms, a list of the deadly and more dangerous species, symptoms of poisoning and treatment; edible forms in general, nutritive values, sale, and preparation for food; culture and preserving of mushrooms. These introductory pages are followed by 96 full page colored plates, each accompanied by a description of the characters, habit, variations, properties, and distinguishing features of each species.—D. S. Welch.

4216. MELIN, ELIAS. Boletus-Arten als Mykorrhizenpilze der Waldbäume. [Boletus mycorrhizas of forest trees.] Ber. Deutsch. Bot. Ges. 40: 94-97. 1922.—The author previously isolated 3 mycorrhizal fungi from *Pinus sylvestris* and *Picea Abies*. Since these fungi did not fruit in pure culture he compared their hyphae with those of *Boletus* species which produce mycorrhizas in these trees; they did not prove to be the same. In infection experiments the author was able to produce synthetic mycorrhizas of *Boletus elegans* on *Larix europaea* and *Boletus luteus* on *Pinus sylvestris* and *Picea Abies*.—W. C. Muenscher.

4217. MILBRAITH, D. G. Alternaria from California. Bot. Gaz. 74: 320-324. Fig. 1-2. 1922.—A new species, *A. oleracea*, is described. It occurs on cabbage, on the leaves of which it causes dark spots lacking the profuse growth of conidia and the zonation characterizing the lesions produced by *A. Brassicae* (Berk.) Sacc. Morphological differences also distinguish the 2 species.—B. W. Wells.

4218. MURRILL, WILLIAM A. Dark-spored agarics—V. *Psilocybe*. Mycologia 15: 1-22. 1923.—The genus *Psilocybe* is briefly characterized, a key to 34 species is given, and each species is described. The following new species are presented: *P. caespitosa*, *P. latispora*, *P. vialis*, *P. Cokeri*, *P. panaeoliformis*, *P. castaneifolia*, *P. castaneicolor*, and *P. caeruleascens*.—H. R. Rosen.

4219. PATOUILARD, N. Quelques espèces nouvelles de champignons. [New species of fungi.] Bull. Trimest. Soc. Mycol. France 38: 83-87. 1922.—The following species are described as new: *Neopectia Thaxteri*, *Calonectria Jimenezii*, *Platyglaea fibrosa*, *Tremella granuliformis*, *Heterochaete ochroleuca*, *Phaeolus iobaphus*, *Phellinus chaetoloma*, *Cladoderris imbricata*, *Rhodophyllus (Entoloma) caeruleatus*. A new genus *Erispora* is described in the Nectriaceae with *E. parasitica* as the type species.—D. S. Welch.

4220. PLANTEFOL, M. Sexualité expérimentale des Basidiomycètes. [Sex in Basidiomycetes.] Ann. Sci. Nat. Bot. 3: xxxii-xli. Fig. 1, 2. 1921.—A review is given of the work of Mlle. Bensaude on certain Agaricaceae. A parallelism is shown to exist between the binucleate condition of certain cells here and that known in the Uredinales. It is pointed out that this probably indicates a kind of sexuality.—Paul Weatherwax.

4221. PILLAY, T. PADMANABHA. Zur Entwicklungsgeschichte von *Sphaerobolus stellatus* Tode. [The development of *Sphaerobolus stellatus* Tode.] Diss. Jahrb. Phil. Fakultät II Univ. Bern. 3: 197-219. Fig. 1-4. 1923.—The reduction division takes place in the basidium and the germ tube from the spore immediately begins to form clamp-connections so that the plant is diploid from the start. There is no primary haploid mycelium since the diploid stage begins with the spore, in which paired nuclei are found. It is not shown how this dikaryon originates but the possibilities are discussed. Information regarding *Gastromycetes* other than *Hypochnus terrestris* is meager. The haploid phase is more developed in *Cyathus* than in *Sphaerobolus*, which was early placed in the *Gastromycetes*. According to the present investigations it probably is to be included in the *Plectobasidiaceae* as established by Fischer. It is suggested that together with *Scleroderma*, *Leucogaster*, and *Melanogaster*, it might be considered intermediate between the *Plectobasidiaceae* and the *Hymenobasidiaceae*.—D. S. Welch.

4222. TIEGS, E., Beiträge zur Oekologie der Wasserpilze. [Contributions to the ecology of water moulds.] Ber. Deutsch. Bot. Ges. 37: 496-501. 1919.—*Leptonitis* is found in water containing large amounts of organic nitrogen. *Sphaerotilus natans* grows commonly in larger streams containing smaller amounts of organic nitrogen. Both of these forms thrive best in alkaline or neutral waters. In contrast, *Penicillium fluitans* n. sp. is found in waters containing acid waste from munition factories.—D. S. Welch.

4223. VAN HOOK, J. M. Indiana fungi. VI. Proc. Indiana Acad. Sci. 1921: 143-148. 1922.—A list of 34 species with place and date of collection is given. In many cases the descriptions are rewritten or amplified.—F. C. Anderson.

4224. WEESE, J. Beitrag zur Morphologie und Systematik einiger Auriculariineengattungen. [The morphology and systematic relationships of certain genera of the Auriculariales.] Ber. Deutsch. Bot. Ges. 37: 512-519. 1919.—The following genera of the family *Phleogenaceae* are discussed: *Stilbum*, *Pilacrella*, *Hoehnelomyces*, and *Phleogena*, with a key for their separation.—D. S. Welch.

4225. WEESE, J. Mykologische und phytopathologische Mitteilungen. [Mycological and phytopathological contributions.] Ber. Deutsch. Bot. Ges. 37: 520-527. 1919.—I. Canker of fruit and shade trees. A review is given of the literature with special reference to those pathogens belonging to the genus *Nectria*. The author previously showed that *N. ditissima* (Tul.) Fr. (= *N. coccinea* (Pers.) Fr.) is not the organism causing the common canker of fruit trees, which is caused by *N. galligena* Bres., a form often incorrectly determined.—II. A disease of orchids. *Nectria bulbicola*, described by P. Hennings and said by him to cause severe injury to orchids, is found to be *N. ochroleuca* (Schw.) Berk., a form which is to the tropics what *N. cinnabarina* is to Central Europe. *N. Orchidearum* Theissen also falls into this species. To control the disease all affected bulbs and roots should be removed.—D. S. Welch.

4226. WESTON, WILLIAM H., JR. Production and dispersal of conidia in the Philippine *Sclerosporas* of maize. Jour. Agric. Res. 23: 239-278. Pl. 1-10. 1923.—In their conidial phases *Sclerospora philippinensis* Weston and *S. spontanea* Weston are injurious parasites of maize in the Philippine Islands. Production of conidia on infected plants is preceded by the establishing on leaves and sheaths of characteristically discolored areas. Conidiophores develop only from the stomata, at night, and when the surface is covered with dew or other moisture. Several are formed at each stoma during the course of the night. Evidence is presented that the conidia are liberated by active ejection from the sterigmata, rather than by passive disjunction, although the writer considers that further investigation is necessary to establish this point. Nocturnal development of conidiophores in the usual amount of dew follows a relatively regular cycle, which, however, may be altered by rain or by drying winds. Conidia are produced in vast numbers and production may be repeated on successive nights when conditions are favorable over a period covering as much as 75 per cent of the total life of the host plant. Dispersal of conidia takes place necessarily at night and is accomplished chiefly by the wind. Splashing, acting either separately or with the wind, and, to a less degree, such agents as surface water, insects, and moist soil laden with conidia are other factors in dispersal. Dissemination of the 2 downy mildews on maize is accomplished in the Philippine Islands by means of the conidia. With reference to the possible entry into the U. S. A. or other countries, the author points out that mycelium in the case of maize itself plays no part in distribution. However, as mycelium in cuttings of other hosts, such as sugar cane and related grasses, these diseases could be carried long distances. The oospore stage is not found on maize in the Philippines. Whether the oogonial *Sclerosporas* occurring on sugar cane and 2 wild grasses in the Islands are related to maize is not known. This stage must be responsible for at least some of the local and distant spread of these fungi and may possibly be involved also in the dissemination of the conidial phases on maize.—*L. M. Massey.*

4227. WESTON, WILLIAM H., JR. The production of conidia at night in species of *Sclerospora*. [Abstract.] Phytopathology 13: 34. 1923.

4228. WINELAND, GRACE O. The production in culture of the ascigerous stage of *Fusarium moniliforme*. [Abstract.] Phytopathology 13: 51. 1923.

LICHENS

4229. BIORET, GEORGE. Les Graphidées corticoles. [The bark-inhabiting Graphidaceae. Ann. Sci. Nat. Bot. 4: 1-68. Pl. 1-11. 1922.—An anatomical and biological description is given of the crustaceous, bark-inhabiting lichens of the Graphidaceae. Much variation in the structure of the thallus is shown in different genera and in different species of the same genus. The development of the thallus is much influenced by the nature of the substratum. Many varieties and some species that have been described are shown to be merely variations due to the state of maturity of the thallus or to the nature of the substratum. No new names are proposed.—*Paul Weatherwax.*

4230. GIARDINI, GIOVANNI I. A preliminary report on the lichens of western Pennsylvania. Bryologist 25: 100-108. 1922.—A list is given of 82 species and varieties of lichens. There is no descriptive matter, but each species listed is accompanied by full notes on locality and habitat, with indication of relative abundance.—*E. B. Chamberlain.*

4231. LYNGE, BERNT. Index specierum et varietatum lichenum quae collectionibus "Lichenes Exsiccati" distributae sunt. [Index of species and varieties of lichens which have been distributed as "Lichenes Exsiccati."] Nyt Mag. (Appendix) 53-60: (in 2 parts, each with separate paging) Part I. pp. 1-559; Part II. pp. 1-316. 1915-1922.—The 1st part contains complete details as to bibliography and contents of 119 different issues of exsiccati containing lichens.—In the 2nd part alphabetical lists are given of every species, variety, and named form in all the issues with citations of serial numbers and issues. Identifications of the different species are not made and synonymies are not given.—*K. Münster Ström.*

4232. MOREAU, FERNAND. *Recherches sur les lichens de la famille Stictacées.* [Lichens of the family Stictaceae.] Ann. Sci. Nat. Bot. 3: 297-376. Pl. 1-4, fig. 1-20. 1921.—The Stictaceae are here treated in the same manner as were the Peltigeraceae in a previous article by the same author in collaboration with Mme. Moreau [see Bot. Absts. 4, Entry 1130]. The problems investigated are: the development of the apothecium, a comparison of the elements of the lichen with corresponding algae and fungi, and the phenomenon of biomorphogenesis. The great uniformity noted in the 11 species studied would justify inclusion in 1 large genus. The algae concerned have the character of Chlorophyceae or of Nostocaceae. The formation of the apothecium and the soredium is described. Fecundation was not observed in any instance. Many apothecia are aborted in primordial stages, this doubtless explaining the sterility of many Stictaceae. A theoretical discussion is given of the relation of the parts of a lichen and the significance of the symbiotic condition.—Paul Weatherwax.

4233. TOBLER, FRIEDERICH. *Biologische Flechtenstudien I.* [Biological studies of lichens. I.] Ber. Deutsch. Bot. Ges. 37: 364-368. Fig. 1-8. 1919.—The soredia of *Cetraria glauca* L. "germinate" on twigs of *Fagus* and *Pinus Picea*, producing distinct thalli which soon fuse into larger matted thalli with irregular margins.—W. C. Muenscher.

BACTERIA

4234. CHOLODNYJ, N. *Ueber Eisenbakterien und ihre Beziehungen zu den Algen.* [Iron bacteria and their relation to algae.] Ber. Deutsch. Bot. Ges. 40: 326-346. Fig. 1-6. 1922.—Algal filaments especially of *Conferva*, growing in water containing iron often possess tubercles, "Psichohormium-Bildungen." These gelatinous masses are incrustated with iron but do not represent enlargements of cell membranes. The tubercles are caused by *Sideromonas Confervarum* n. g., n. sp., a short cocco-bacillus, the cells of which tend to form chains. The presence of many of these chains explains the characteristic spongy structure of the tubercles. The tubercles often produce a hypertrophy of the chlorophyll apparatus in the enclosed cells, which have a dark green color and store quantities of reserve food. These "modified cells" apparently represent a resting stage of the alga. The formation of these modified cells suggests a symbiotic relationship between *Sideromonas* and *Conferva*, in which the iron bacteria probably obtain oxygen from the assimilating algal cells.—W. C. Muenscher.

4235. KITCHEN, J. *A key for the identification of bacteria.* Jour. Roy. Microsc. Soc. London 1921: 378-380. 1921.—An index number system is given, suggested as more easily memorized than that used by the Society of American Bacteriologists.—Wm. Randolph Taylor.

4236. LISK, HENRIETTA. *Gas production by an aerobic spore bearing bacillus.* Jour. Amer. Water Works Assoc. 10: 139-144. 1923.—The writer has found an organism in milk which shows morphological and physiological characteristics corresponding to those described for *B. asterosporus*. The conclusion is reached that all aerobic, spore bearing, gas producing bacilli so far described are probably this species.—D. S. Welch.

4237. Mutch, N. *The isolation of the single bacterial cell.* Jour. Roy. Microsc. Soc. London 1919: 221-224. Fig. a. 1919.—Hanging drops of a suspension of the organisms are examined in a moist slide provided with a ring of filter paper wet with salt solution. These drops are prepared by a series of dilutions. When a drop with but 1 organism has been obtained additional sterile nutrient is added and the slide set aside to allow the organism to increase enough to permit bulk transfers.—Wm. Randolph Taylor.

4238. NORTON, JOHN F., and GORDON E. DAVIS. *Bacteriostatic action of dyes on Streptococcus viridans and pneumococci.* Jour. Infect. Diseases 32: 220-222. 1923.—No difference was noted between the action of dyes on the *Streptococcus viridans* and on the pneumococcus groups. The bacteriostatic action was marked only where the dyes contained 3 benzol rings and 2 or more amino groups containing alkyl radicals.—R. L. Starkey.

4239. POTTHOFF, HEINZ. Zur Frage nach dem Vorkommen von Befruchtungsvorgängen bei Bakterien. [On the occurrence of fertilization processes in bacteria.] *Naturwissenschaften* 10: 441-446. Fig. 1-12. 1922.

4240. TRUFFAUT, GEORGES, et N. BEZSSONOFF. Un nouveau bacille fixateur d'azote. [A new nitrogen-fixing bacterium.] *Compt. Rend. Acad. Sci. Paris* 175: 544-546. 1922.—The organism, which is described as *Bacillus Truffauti*, resembles *Bacillus vulgaris* in structure. It fixes as much as 7 mgm. of nitrogen per gm. of levulose consumed, and develops rapidly under anaerobic conditions.—C. H. Farr.

4241. WALKER, JOHN E. Variations in *Streptococcus hemolyticus* on animal passage. *Jour. Infect. Diseases* 32: 287-296. 1923.—The appearance of colonies and the virulence of the "moist" type of *Streptococcus epidemicus* altered with age and acquired the characteristics of *S. hemolyticus*. With animal passage, *S. hemolyticus* showed the reverse tendencies.—R. L. Starkey.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD. W. BERRY, *Editor*

(See also in this issue Entries 3774, 3779, 3818, 3855)

4242. BERTRAND, PAUL. Sur les flores houillères de la Sarre. [On the coal flora of the Sarre region.] *Compt. Rend. Acad. Sci. Paris* 175: 770-773. 1922.—The flora is given of 4 or 5 zones, which are named after the characteristic species, as follows: Zone of *Pecopteris lamurensis*, zone of *Mixoneura ovata*, zone of *Pecopteridium Defrancei*, zone of *Neuropteris tenuifolia*. The last-named is said to correspond to the zone of *Neuropteris tenuifolia* and *Linopteris sub-Brongiarti* of northern France, where the 3rd zone given above is not represented. The 2nd zone corresponds exactly to that of *Mixoneura flexuosa* of the Gard region. The 1st zone, which constitutes the lower beds of the Ottweiler, represents the series of Rive-de-Gier in the lower series of the Molières of the Gard region.—C. H. Farr.

4243. BOOTH, A. L. The microstructure of coal from an industrial standpoint. *Jour. Roy. Microsc. Soc. London* 1922: 151-160. Pl. 6, 7. 1922.

4244. CARPENTIER, A. Revue des travaux de paléontologie végétale publiés dans le cours des années 1910-1919. Premier partie: Paléozoïque. Suite. [Review of the work in plant paleontology published in the course of the years 1910-1919. First part: Paleozoic. Continued.] *Rev. Gén. Bot.* 35: 42-47, 101-112, 149-160. 1923.

4245. DEPAPE, GEORGES. Recherches sur la flore pliocène de la vallée du Rhône.—Flôres de Saint-Marcel (Ardèche) et des environs de Théziers (Gard). [Pliocene flora of the valley of the Rhone.] *Ann. Sci. Nat. Bot.* 4: 73-265. Pl. 1-15, Fig. 1-45. 1922.—This is a monographic account of the Pliocene floras from Saint Marcel, Théziers, Bagnols and Eure in the western valley of the Rhone, of upper Plaisancian age, and of Vacquières of lower Astian age. There is a good bibliography, the Pliocene geology is discussed, and the species are elaborately described and illustrated. The total flora numbers 72 for the most part well known species, only 1, *Polygonatum pliocenicum*, being described as new. The following genera are represented: *Woodwardia*, *Osmunda*, *Ginkgo*, *Torreya*, *Glyptostrobus*, *Sequoia*, *Cupressus*, *Pinus*, *Phragmites*, *Sabal*, *Smilax*, *Salix*, *Populus*, *Alnus*, *Carpinus*, *Fagus*, *Quercus*, *Castanea*, *Juglans*, *Pterocarya*, *Carya*, *Myrica*, *Ulmus*, *Zelkova*, *Buxus*, *Liriodendron*, *Laurus*, *Persea*, *Oreodaphne*, *Sassafras*, *Cinnamomum*, *Buettneria*, *Zanthoxylon*, *Pirus*, *Robinia*, *Acer*, *Sapindus*, *Celastrus*, *Ilex*, *Berchemia*, *Cornus*, *Liquidambar*, *Platanus*, *Trapa*, *Diospyros*, *Viburnum*, *Notelea*, *Fraxinus*, *Phillyrea*, *Nerium*, and *Coriaria*. The most varied genera are *Quercus*, *Populus*, *Acer*, and *Viburnum*. Thirty-one are identical with, or close to, still living species, 11 have decided North American affinities, 11 are Oriental, 5 are related to forms still living in

the Canary Islands, 28 are Mediterranean, 4 are Caucasian, and 16 are European cool temperate. The ecological bearing is carefully analyzed and the flora is considered to represent elements of the littoral, stream valleys, hills, and uplands of 1000 m. or more. The precipitation is considered to have been variable for these different zones, though ample. The mean annual temperature is considered to have been about 20°C. The fossils are carefully compared with both recent and fossil floras.—E. W. Berry.

4246. DOUIN, R. Les mousses et les hépatiques fossiles des tufs du Lautaret (Hautes Alpes). [The fossil mosses and liverworts of the tufa of the Lautaret (High-Alps).] Rev. Gén. Bot. 35: 113-126. Pl. 1-2. 1923.—The earlier work on the fossil liverworts and mosses is briefly reviewed. The age and origin of the tufa of Lautaret is discussed and the flora of this region briefly mentioned. The author determined 5 mosses of the family Hypnaceae and 5 liverworts, all, apparently, belonging to the acrogynous Jungermanniaceae. The mosses were *Amblystegium riparium* Br., *Hypnum commutatum* Hedw., *H. irrigatum* Zett., *H. falcatum* Brid., *Eurynchium circinnatum* B. E., var., *deflexifolium* Boulay. The liverworts described are: *Lophozia Hornschuchiana* Nees, *Jamesoniella Carringtoni* (Balf.) Schiffner var. *alpina* R. Douin, *Pedinophyllum interruptum* (Nees) Schiffner, *Plagiochila asplenoides* L., and *Aplozia riparia* (Tayl.) Dum.—J. C. Gilman.

4247. FLORIN, R. Zur Alttertiären Flora der südlichen Mandschurei. [The Older Tertiary Flora of Southern Manchuria] Palaeont. Sinica A1: 1-52. Pl. 8, fig. 3. 1922.—The author describes a considerable flora from the coal measures of Fu-Shun in southern Manchuria the age of which is considered upper Eocene or lower Oligocene. The following genera represented by previously described species are discussed: *Lygodium*, *Osmunda*, *Sequoia*, *Dryophyllum*, *Fagus*, *Zelkova* (?), *Panax* (?), *Viburnum*, *Phyllites*, *Glyptostrobus*, *Corylus* (?), *Carpinus*, *Alnus*, *Populus*.—E. W. Berry.

4248. KNOWLTON, F. H. Fossil plants from the Tertiary Lake beds of south-central Colorado. U. S. Geol. Surv. Professional Paper 131: 183-197. Pl. 41-44. 1923.—The author describes the fossil plants from lake beds in the volcanic series of south-central Colorado which are considered to be upper Miocene in age. The following species are recorded: *Pinus crossii* n. sp., *P. similis* n. sp., *P. coloradensis* n. sp., *P. florissanti* Lesq., *Abies rigida* n. sp., *A. longirostris* n. sp., *Sabina linguifolia* (Lesq.) Ckl., *Populus lesquereuxi* Ckl., *Alnus larseni* n. sp., *Planera myricaefolia* (Lesq.) Ckl., *Rubus inquirendus* n. sp., *Ribes protomelaenum* Ckl., *Vitis florissantella* Ckl., *Odostemon marginata* (Lesq.) Knowlton, *O. hakeaefolia* (Lesq.) Knowlton, *Sterculia aceroides* n. sp., *Phyllites potentilloides* n. sp., and 2 species of *Phyllites*.—E. W. Berry.

4249. KNOWLTON, F. H. Revision of the flora of the Green River formation with descriptions of new species. U. S. Geol. Surv. Professional Paper 131: 133-182. Pl. 36-40. 1923.—This is a revision of this middle Eocene flora. Thirty-six species in the literature are dropped as worthless or from other horizons. *Alnites* and *Alnus* become *Planera*; *Ampelopsis* becomes *Parthenocissus*; *Ceanothus* becomes *Zizyphus*; *Myrica* becomes *Rhus*; and *Pecopteris* becomes *Osmunda*. The recognized Green River flora now consists of 81 species and comprises 3 fungi, 5 ferns, 8 equisetums, 9 monocotyledons including 3 palms, and among the dicotyledons the genera *Salix*, *Myrica*, *Comptonia*, *Juglans*, *Quercus*, *Planera*, *Ficus*, *Lomatia*, *Oreodaphne*, *Pimelia*, *Brasenia*, *Sedum*, *Ailanthus*, *Amygdalus*, *Dalbergia*, *Leguminosites*, *Sophora*, *Mimosites*, *Sapindus*, *Rhus*, *Euonymus*, *Acer*, *Ilex*, *Zizyphus*, *Cissus*, *Parthenocissus*, *Eucalyptus*, *Aralia*, *Andromeda*, *Sambucus*, *Achaenites*, *Antholithes*, *Carpolithus*, *Carpites*, *Phyllites*, and *Nordenskioldia*.—The following are described as new: *Caenomyces eucalyptae*, *C. sapindicola*, *Danaea coloradensis*, *Pontederites hesperia*, *Salix linearis*, *S. longiacuminata*, *Myrica minuta*, *M. praedrymeja*, *Comptonia* (?) *anomala*, *Juglans winchesteri*, *Oreodaphne viridiflumensis*, *Pimelia spatulata*, *Sedum hesperium*, *Dalbergia viridiflumensis*, *D. retusa*, *Sophora coloradensis*, *Mimosites coloradensis*, *Sapindus winchesteri*, *Rhus myricoides*, *Sambucus winchesteri*, *Achaenites cichoroides*, *Carpolithus caryophylloides*, *Carpites newberryana*, *C. inquirenda*, *Phyllites winchesteri*, *C. coloradensis*.—E. W. Berry.

4250. KRAUSEL, R. Ist *Taxodium distichum* oder *Sequoia sempervirens* Charakterbaum der deutschen Braunkohle? [Is *Taxodium distichum* or *Sequoia sempervirens* the characteristic tree of the German lignite?] Ber. Deutsch. Bot. Ges. 39: 258-263. Fig. 1-3. 1921.—Sections of wood from the lignite deposits of Germany showed numerous resin canals, especially in the wound tissue, which have not been found in *Taxodium distichum* or *T. mexicanum*. The author therefore concludes that the common tree in these lignite deposits is *Taxodioxydon sequoianum* (the Tertiary form of *Sequoia sempervirens*) and not *Taxodioxydon taxodii* (the Tertiary form of *Taxodium distichum* including *T. mexicanum*.) [See also following entry.]—W. C. Muenscher.

4251. KUBART, B. Ist *Taxodium distichum* oder *Sequoia sempervirens* Charakterbaum der deutschen Braunkohle? [Is *Taxodium distichum* or *Sequoia sempervirens* the characteristic tree of the German lignite?] Ber. Deutsch. Bot. Ges. 39: 26-30. Fig. 1-2. 1921.—According to some investigators brown coals or lignites found in Germany are composed largely of the Tertiary form of *Taxodium distichum*. Other investigators state that the plant concerned here is the Tertiary form of *Sequoia sempervirens*. Woods with wood parenchyma cells with thickened and pitted cross walls have been referred to *Taxodioxydon taxodii* (the Tertiary form of *Taxodium distichum*). Woods with thin, non-pitted cross walls in the wood parenchyma cells were referred to *Taxodioxydon sequoianum* (the Tertiary form of *Sequoia sempervirens*). The author points out that the wood in these lignite deposits cannot be referred with certainty to either *Sequoia* or *Taxodium* since *Taxodium mexicanum* has cross walls in the wood parenchyma cells that are more or less similar to those in *Sequoia sempervirens*. [See also preceding entry.]—W. C. Muenscher.

4252. LUNDQVIST, G. Fossile Pflanzen der Glossopteris Flora aus Brasilien. [Fossil plants of the Glossopteris flora in Brazil.] K. Svenska Vetens.-Akad. Handl. 60³: 1-36. pl. 1-2. 1919.—The author describes the following Permian plants from Paraná and Rio Grande do Sul: *Marchantites*, *Schizoneura* sp., *S. gondwanensis* Feist. (?), *Sigillaria brardi* Brongn., *S.* sp., *Knorria* sp., spores, *Cardiocarpon* sp., *Glossopteris browniana* Brongn. (?), *G. indica* Schimp., *G.* sp., *Gangamopteris obovata* (Carr.) White, *G.* sp., *Neuropteridium plantianum* (Carr.) White, *Noeggerathiopsis hislopi* (Bunb.) Feist., *Arberia* (?) *brasiliensis* n. sp., *Voltzia heterophylla* Brongn. (?), *Annularia australis* Feist., *Sphenophyllum oblongifolium* Unger, *Pecopteris* sp., *Brachyphyllum* (?) *australe* Feist.—E. W. Berry.

4253. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. VI, Part 5. p. 219-254, pl. 224-227. John Spence: Sydney, 1922.—This part continues the discussion of the topic "Fossil plants attributed to *Eucalyptus*" and deals particularly with those fossil forms found in countries outside of Australasia. The following species, although previously published, redescribed, and illustrated: *Eucalyptus oceanica* Unger, *E. Haeringiana* Ettingshausen, *E. aegea* Unger, *E. sibirica* Heer, *E.* (?) *americana* Lesq., *E. borealis* Heer, *E. angusta* Velenovsky, *E. dubia* Ettingshausen, *E. dakotensis* Lesq., *E. Gouldii* Ward, *E. proto-Geinitzi* Saporta, *D. Choffati* Saporta, *E.* (?) *attenuata* Newberry, *E.* (?) *angustifolia* Newberry, *E.* (?) *nervosa* Newberry, *E.* (?) *parvifolia* Newberry, *E. latifolia* Hollick, *E. Wardiana* Berry, *Myrcia havanensis* Berry, *Myrtophyllum* (*Eucalyptus*?) *Geinitzi* Heer, and *M.* (*Eucalyptus*?) *Schubleri* Heer. A chapter is also added on the "Exudates" of *Eucalyptus*.—J. M. Greenman.

4254. PILGER, R. Die Stämme des Pflanzenreichs. [The lineage of the plant kingdom.] 2nd ed., 119 p., 23 fig. Vereinigung Wissenschaftliche Verleger: Berlin and Leipzig, 1921.

4255. RUDOLPH, KARL. Zur Kenntnis des Baues der Medullosen. [The structure of the Medullosa.] Beih. Bot. Centralbl. II Abt., 39: 196-222. Pl. 3-4. 1922.—The stem of *Medullosa stellata*, *M. porosa*, and *M. Leuckarti* is a solenostele (amphiphloic siphonostele). The primary wood of this stem consists of parenchyma with more or less numerous tracheids similar to *Heterangium*.—The outer wood has gaps the arrangement of which has not been determined.—While the tracheids of the stem extend lengthwise as a rule, a cross section of

the primary xylem shows constantly: (1) an inner layer with tracheids extending lengthwise; (2) a middle layer with tangential horizontal tracheids; (3) a small outer layer with tracheids extending lengthwise.—The condition of the middle layer with its horizontal tracheids is compared with the girdle bundles in the cydales. It is suggested that the problem of the horizontal tracheids may be an ecological one.—*L. Pace.*

4256. SAHNI, B. **The present position of Indian palaeobotany.** Proc. Asiatic Soc. Bengal 174: clix-clxxv. 1921 [1922].—A historical and stratigraphic account is given of the present status of the study of the fossil floras of India from the Cambrian to the post-Tertiary. It is especially important in connection with the more abundant floras of the Gondwana series, giving lists of species with their horizons for the Carboniferous, Permian, Triassic, Jurassic, and Cretaceous, with a bibliography.—*E. W. Berry.*

4257. WALKOM, A. B. **Paleozoic floras of Queensland. Part 1. The flora of the Lower and Upper Bowen Series.** Queensland Geol. Surv. Publ. 270. 64 p., 9 pl. 1922.—A monographic account is given of 23 different plants, members of the *Glossopteris* flora, that comprise the flora of the Bowen series. *Glossopteris jonesi* and *Samaropsis etheridgei* are described as new, and the following are recorded from Queensland for the 1st time: *Phyllothea robusta*, *Glossopteris tortuosa*, *Gangamopteris cyclopteroides*, *G. angustifolia*, and *Dictyopteridium sporiferum*. Scale fronds of *G. lossopteris* are described and seed associated with this genus and described as *Nummulospermum bowenense* are considered as its probable fruits. The Bowen series is of Permian, or Permo-Carboniferous, age.—*E. W. Berry.*

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 3650, 3651, 3661, 3699, 3703, 3712, 3716, 3718, 3719, 3751, 3773, 3779, 3782, 3793, 3800, 3904, 3931, 3933, 3937, 3953, 3977, 3979, 4003, 4005, 4012, 4029, 4032, 4043, 4047, 4053, 4055, 4056, 4073, 4074, 4080, 4102, 4119, 4134, 4136, 4138, 4148, 4149, 4181, 4183, 4190, 4192, 4193, 4194, 4195, 4196, 4197, 4198, 4200, 4201, 4205, 4208, 4209, 4210, 4212, 4213, 4216, 4217, 4225, 4226, 4227, 4228, 4234, 4454, 4473, 4491, 4503, 4560, 4583, 4592, 4594, 4597, 4713, 4715, 4717.)

DISEASES CAUSED BY FUNGI

4258. ANONYMOUS. **Kaalbrok.** [Clubroot.] Tidsskr. Planteavl. 28: 563-566. 1922.—This is a discussion of the effects of clubroot (*Plasmodiophora Brassicae*) on the roots of crucifers.—*Albert A. Hansen.*

4259. ALCOCK, M. L. **A die-back in Sussex.** Trans. British Mycol. Soc. 8: 190. 1923.—*Diplodia Griffoni* Sacc. & Trav. was found to be the cause of a bark disease of apple trees in Sussex.—*W. B. McDougall.*

4260. ALLEN, RUTH F. **A cytological study of infection of Baart and Kanred wheats by *Puccinia graminis tritici*.** Jour. Agric. Res. 23: 131-151. pl. 1-6. 1923.—The variety Baart is susceptible to the strain (I) of the fungus used while Kanred is immune. Germination of urediniospores and the formation of substomatal vesicles is the same on both hosts. In Kanred, however, the number of entrances is small, apparently due in part to the smallness of the stomatal opening. In Baart, a slender hypha issuing from the vesicle proceeds until it comes in direct contact with a cell. It then swells at the tip, its pair of nuclei divide, a septum is formed and the terminal cell which is closely applied to the host cell becomes the haustorium mother cell. From the mother cell, penetration of the cell wall of the host is effected through an invisible pore. The plasma membrane of the host cell is invaginated by the enlarging haustorium. A new growing point arises from the pe-

ultimate cell of the hypha and other haustorial mother cells may be produced in the substomatal vesicle or in intercellular spaces. The process is the same in Kanred until a haustorium is formed. Penetration of the host cell is actually accomplished but the haustorium soon shrinks and dies and the effect is communicated to the mother cell or even farther. The host cell likewise dies but diffusion of material from the dead host cells to healthy ones seems to be prevented by the formation of thickened contact walls. The fungus may produce several infecting hyphae before it is completely exhausted.—The osmotic concentration of the attacked host cell is changed. Various theories of immunity are discussed but the chemical theory seems to correspond best with the facts observed.—*D. Reddick.*

4261. BARSALI, E. *Il seccume dei Platani.* [Leaf blight of *Platanus*.] *Processi Verbali Soc. Toscana Sci. Nat.* 28: 6-8. 1919.—The 3 forms of *Gloeosporium* found on leaves and branches of *Platanus* affected with sycamore leaf blight or anthracnose (*Gloeosporium nervisequum* (Fekl.) Sacc., *G. nervisequum* var. *valsoideum* Saac., and *G. Platani* (Mont.) Oud. have been determined to be the same fungus, all 3 being conidial forms of *Gnomonia veneta* (Sacc. & Speg.) Kleb. The slight variations in spore measurements may be attributed to differences in substratum, as verified by artificial cultures.—The disease has spread rapidly in Italy and is particularly prevalent in cold, wet springs. Cultivation of resistant varieties of sycamore is considered the most effective means of control.—*Edith K. Cash.*

4262. BARSS, H. P. Copper carbonate for wheat smut control. *Oregon Agric. Exp. Sta. Circ.* 30. 3 p. 1922.—This article discusses preliminary tests and gives directions for using this dust treatment.—*C. E. Owens.*

4263. BERGER. *Ist der Hallimasch Parasit oder Saprophyt?* [Is the "honey fungus" [*Armillaria mellea*] a parasite or a saprophyte?] *Forstwiss. Centralbl.* 44: 424-431. 1922.—Since Hartig's experiments in 1872 it has generally been considered that the fungus is both saprophytic and parasitic, although some have asserted that it attacks only diseased plants. Berger cites observations indicating that the fungus is saprophytic only. In all cases investigated the affected trees were also attacked by bark-beetles, injured by lightning, or otherwise weakened; in no case did the author observe an otherwise healthy tree attacked by *Armillaria mellea*. His theory is that infection must be preceded by fermentation or decomposition of the sap, such as occurs on freshly cut stumps and in trees attacked by bark-beetles or otherwise injured.—*W. N. Sparhawk.*

4264. BIRMINGHAM, W. A. Diseases of *Pinus insignis*. *Australian Forest. Jour.* 5: 181-182. 1 fig. 1922.—*Thelephora terrestris*, responsible for what is commonly known as "smothering disease," is very briefly discussed.—*C. F. Korstian.*

4265. BLANCHARD, M., et G. LEFROU. Présence dans une lésion humaine d'un saccharomycète pathogène pour le cobaye. [Presence in a human lesion of a saccharomycete pathogenic to guinea pigs.] *Bull. Soc. Path. Exotique* 15: 915-918. 1922.—A saccharomycete was present "to the exclusion of all other germs" in a deep abscess of the scapulo-vertebral region of a European at Brazzaville, French West Africa. Attempts to culture this yeast on several media failed. Pus injected into guinea pigs produced swellings and ulcers in which this yeast was the only organism demonstrable.—*Philip Brierley.*

4266. BRANSTETTER, B. B. Fungi internal to Missouri seed corn of 1921. *Jour. Amer. Soc. Agron.* 14: 354-357. 1922.—A disease survey shows that 1921 Missouri corn was heavily infected with *Fusarium moniliforme*, *Cephalosporium Sacchari*, and *Diplodia Zeae* in the order named, that kernels of many ears were infected with 2 of the above fungi, and that with care comparatively disease-free ears can be selected, thus eliminating the necessity of using the germinator as a means of detecting heavy infection.—*F. M. Schertz.*

4267. BRENTZEL, W. E. A disease of flax not previously reported in the United States. [Abstract.] *Phytopathology* 13: 53-54. 1923.—This disease is probably the same as that produced by *Phlyctaena linicola* Speg. in South America.—B. B. Higgins.

4268. BRENTZEL, W. E. Disease of flax caused by a species of *Rhizoctonia*. [Abstract.] *Phytopathology* 13: 53. 1923.

4269. BRITON-JONES, H. R. The smuts of millet (*Andropogon Sorghum* Brot.). Ministry Agric. Egypt Tech. and Sci. Serv. (Bot. Sec.) Bull. 18. 6 p., 3 pl. 1922.—The following smuts of millet occurring in Egypt are briefly discussed, including occurrence, descriptions of the disease and causal fungus, and methods of treatment: long smut (*Tolyposporium filiferum* Busse), head smut (*Ustilago reiliana* Kuehn), and grain smut (*Sphacelotheca Sorghi* (Lk.) Clinton).—Frederick V. Rand.

4270. BRUIJN, HELENA L. G. DE. The saprophytic life of *Phytophthora* in the soil. Mededeel. Landbouwhoogeschool Wageningen 24: 1-38. 2 pl. 1922.—Researches into the nature of *Phytophthora Syringae* Klebs brought the author to the same conclusions as reached by Klebahn (1904), who was of the opinion that the fungus persists in the soil. Experiments were also conducted with *P. erythroseptica* Peth. and with *P. infestans* DeBy., bog soil, leaf mold, and other types of soil being used. The soils were put into test tubes just as received from nature, and sterilized. Portions of pure cultures with some of the medium were then transferred to the soil tubes. Soon the mycelium started growth in the surrounding soil, and the latter, containing the fungus, was again transferred to other soil tubes to make sure that the fungi could live on soil alone. All 3 species were found to persist in soil, but the external behavior differed among them. *P. Syringae* forms white aerial mycelium on the top of the soil if the humidity is favorable; if too moist, however, the fungus, though alive, may not be visible. *P. erythroseptica* forms more aerial mycelium, and behaves differently on different types of soil, developing well on clay. *P. infestans* is not easily cultivated, and the growth of the fungus is rather slow. A piece of medium containing the fungus was transferred to a tube with sterilized bog soil whereupon the mycelium soon spread over the surrounding soil. After 4 weeks the transferred piece of agar was taken out of the tube, leaving the mycelium on the soil alone, and later the bog soil with the fungus was transferred to all the other types of soil under test, and in each case it grew successfully. Its aerial mycelium grows toward the lower parts of the test-tubes, while the other 2 species form their aerial mycelium at the top of the soil. *P. infestans* grows best on clay, less well on leaf mold, and rather poorly on sand. The genus *Phytophthora* is not such an obligate parasite as was formerly supposed.—J. C. Th. Uphof.

4271. BURGER, O. F. Melanose and stem-end rot of citrus fruits. [Abstract.] *Phytopathology* 13: 45. 1923.—Both diseases are caused by *Phomopsis Citri* Faw.—B. B. Higgins.

4272. COLLINS, J. FRANKLIN. A noteworthy case of resistance to the chestnut bark disease. [Abstract.] *Phytopathology* 13: 47. 1923.

4273. COONS, G. H. Control of stinking smut of wheat (*Tilletia levis*) with dust treatments. [Abstract.] *Phytopathology* 13: 37. 1923.

4274. COONS, G. H., and RAY NELSON. Yellows-resistant celery: 3rd progress report. [Abstract.] *Phytopathology* 13: 56. 1923.—The disease is due to *Fusarium* sp.—F. V. Rand.

4275. CRÉPIN, C. Une maladie grave de la pomme de terre dans le Forez. [A serious disease of Irish potato in the Forez.] Bull. Soc. Path. Vég. France 9: 237-243. Fig. 1-2. 1922.—Some seriously diseased potato plants had rolled leaves, but this trouble differed from true leaf-roll in that the parenchyma was soft. The cause of the disease is *Vermicularia varians* Duc.—J. Dufrenoy.

4276. CUNNINGHAM, G. H. Apple and pear black spot: their appearance, cause, and control. New Zealand Jour. Agric. 25: 20-31. Fig. 1-12. 1922.—The apple scab, *Venturia inequalis*, is described in detail, and pear scab, *Venturia pirina*, is briefly discussed. Destruction of fallen leaves is recommended and a detailed spray schedule is given.—N. J. Giddings.

4277. CUNNINGHAM, G. H. Brown rot, *Sclerotinia cinerea* Schroet. Its appearance, cause and control. New Zealand Jour. Agric. 25: 83-93. Fig. 1-8. 1922.—Brown rot was not particularly destructive in New Zealand until 1915, but since that time has been one of the most serious diseases of stone fruits. The disease is described in detail and control measures are fully discussed. A recommended spray schedule for leaf curl and brown rot is given.—N. J. Giddings.

4278. CUNNINGHAM, G. H. Coral spot, *Nectria cinnabarina* (Tode) Fries. A wound parasite of fruit-trees. New Zealand Jour. Agric. 25: 354-359. Fig. 1-7. 1922.—This disease is quite prevalent and causes greater injury than is usually believed. The appearance of infected tissues is described. The life history of *Nectria cinnabarina* is given. General sanitation regarding woody tissues is recommended for control.—N. J. Giddings.

4279. CUNNINGHAM, G. H. Leaf curl, bladder plum and cherry curl. Their appearance, cause, and control. New Zealand Jour. Agric. 26: 85-97. Fig. 1-10. 1923.—Leaf curl, *Taphrina deformans* (Fcl.) Tulasne, is quite prevalent in New Zealand. It occurs on peaches, nectarines, almonds, and apricots. Hobbs Royal, Charlotte, Hale's Early, and Saunders are listed as somewhat resistant varieties.—Bladder plum, *Taphrina Pruni* (Fcl.) Tulasne, occurs on both English and Japanese varieties of plums but is most serious on the latter. Cherry curl, *Taphrina minor* Sadeb., occurs in only 2 localities in New Zealand and shows no evidence of spreading.—The 3 diseases are described in some detail and control measures suggested.—N. J. Giddings.

4280. CUNNINGHAM, G. H. Leaf rust, *Puccinia Pruni-spinosae* Pers. Its appearance, cause, and control. New Zealand Jour. Agric. 25: 271-277. Fig. 1-9. 1922.—Leaf rust is common on stone fruits in New Zealand, causing serious defoliation and injuries to the fruit. Appearance of the disease and life history of the organism are discussed. The alternate host, anemone, is not common and it is believed that the disease also overwinters in the uredo stage. Plowing under of all infected leaves and spraying with lime-sulphur are recommended as control measures.—N. J. Giddings.

4281. CUNNINGHAM, G. H. Silver blight, *Stereum purpureum* Pers. New Zealand Jour. Agric. 24: 276-283. Fig. 1-8. 1922.—Silver blight or silver leaf is common in New Zealand on almonds, apples, apricots, cherries, currants, gooseberries, nectarines, peaches, pears, plums, quinces, and many ornamental trees and shrubs. It causes losses of 1-10 per cent and is most injurious to stone fruits. Symptoms, pathological histology, life history, and preventive treatment are discussed.—N. J. Giddings.

4282. CUNNINGHAM, G. H. The significances of apothecia in the control of brown rot of stone fruits. New Zealand Jour. Agric. 25: 225-230. Fig. 1. 1922.—Large numbers of apothecia of *Sclerotinia cinerea* have been found growing from peach and plum mummies; detailed studies have been made and will be reported elsewhere. Cultivation is believed to be a very important factor in control as apothecia were found only where the mummies were on, or in, closely compacted soil. An apothecium was formed from a mummy buried at a depth of 3 inches.—N. J. Giddings.

4283. DICKSON, JAMES G. The influence of soil temperature and moisture on the development of seedling blight of wheat and corn caused by *Gibberella Saubinetii* (Mont.) Sacc. [Abstract.] Phytopathology 13: 50. 1923.

4284. DRECHSLER, CHARLES. A new blossom-end decay of watermelons caused by an undescribed species of *Pythium*. [Abstract.] *Phytopathology* 13: 57. 1923.

4285. DRECHSLER, CHARLES. The occurrence of zonate eye-spot [*Helminthosporium giganteum* H. & W.] on various grasses and its mode of extension. [Abstract.] *Phytopathology* 13: 59-60. 1923.

4286. DUCOMET, V. Observations sur le developpement du *Rhizoctone* de la luzerne. [The spread of *Rhizoctonia* on Medicago.] *Bull. Soc. Path. Vég. France* 9: 312-316. 1922.—*Rhizoctonia* infects those lucerne plants suffering from drought. The only way to combat the disease seems to lie in caring for the proper nutrition of the plant.—*J. Dufrénoy*.

4287. DUFRÉNOY, J. Biologie de l'*Armillaria mellea*. [Biology of *Armillaria mellea*.] *Bull. Soc. Path. Vég. France* 9: 277-281. *Fig. 1-2*. 1922.—*A. mellea* proves a dangerous pathogen for trees, chiefly chestnut and walnut, when planted too deeply. Destruction of plum, cherry, and walnut orchards is recorded. Grafting of *Juglans regia* on *J. Hindsii* is advocated.—*J. Dufrénoy*.

4288. ECKERSON, S. H., and JAMES G. DICKSON. The influence of soil temperature and moisture on the chemical composition of wheat and corn and their predisposition to seedling blight. [*Gibberella Saubinetii* (Mont.) Sacc.] [Abstract.] *Phytopathology* 13: 50-51. 1923.

4289. EDSON, H. A., and M. SHAPOVALOV. Parasitism of *Sclerotium Rolfsii* on Irish potatoes. *Jour. Agric. Res.* 23: 41-46. *Pl. 1-3*. 1923.—Potatoes infected with this organism may show any of the following symptoms: seed-piece rot, damping-off, stemrot, wilt or blight. When tubers are affected, a progressive soft, white rot with profuse extrusion of liquid results. Destruction of host tissue is accomplished without hyphal penetration.—Varietal strains of the fungus, both physiological and morphological, are shown to exist.—*D. Reddick*.

4290. FILLEY, W. O., and H. W. HICOCK. Control of the white pine blister rust in Connecticut 1909-1921. *Connecticut Agric. Exp. Sta. Bull.* 237. 305-326. *Pl. 23-26*. 1922.—The white pine blister rust was found in the State in 1909. White pine has been said to be essential to the practice of forestry in the State; therefore it commands much care and study. A history of the causative organism, *Cronartium ribicola*, together with its life cycle on 2 hosts is given. Measures for control instituted by the Federal Government and by the State are given. Scouting for and removal of infected *Ribes* has been carried on since 1917. Infected pines may also be destroyed. Future observation is necessary to check up the effectiveness of the removal of the 2 species infected. The possible area of serious infection is limited to about 500 square miles in the northwestern part of the State where wild *Ribes* plants are abundant. It has been found that infection takes place through the stomata of the leaves; also, that 2 and 3-needled pines may be infected as readily as the 5-needled pines. A survey has shown the State to contain 20,000 acres of pure pine over 25 years of age and 20,000 acres under 25 years of age. There are 150,000 acres of pine-hardwoods with more than 40 per cent of other species. The forest area of the State is 1,483,300 acres and there is a stand of pine totaling 150,000,000 board feet.—*Henry Dorsey*.

4291. FOËX, E. La dartrose de la pomme de terre en 1922. [The dartrose disease of the Irish potato.] *Bull. Soc. Path. Vég. France* 9: 244-250. 1922.—*Vermicularia varians* Duc. developed as a pathogen on potato plants in most parts of France. A relation between geographical distribution of the disease and ecological factors is indicated. To control the disease, seed from infected plants should be avoided. Seed disinfection is also advocated.—*J. Dufrénoy*.

4292. FUNK, GEORG. Zur Kenntnis der Keimlingserkrankungen bei Koniferen. [Diseases of conifer seedlings.] *Forstwiss. Centralbl.* 44: 381-388. 1922.—The "damping-off" of

coniferous seedlings has been attributed by various writers to a fungus (*Fusoma parasiticum* Tubeuf), the effect of excessive heating of the surface of the soil, stagnant moist atmosphere and excessive soil moisture, or combinations of these causes. Funk has found that *Fusoma* is ordinarily saprophytic, but it becomes parasitic on seedlings which are in a weakened condition. This is also the case with several other fungi of the genera *Fusoma*, *Fusarium*, and *Botrytis*, which destroy conifer seedlings. Many diseased seedlings are found to have their roots covered with minute mites, probably species of *Tyrophypus*. It seems probable that the roots wounded by these mites are made susceptible to attack by the fungi.—W. N. Sparhawk.

4293. GARBOWSKI, L. La lutte contre le blanc de groseillier (*Sphaerotheca Mors-uvae* Berk. et Curt.). [Control of gooseberry mildew.] Bull. Trimest. Soc. Mycol. Franc 38: 98-99. 1922.—Experiments indicate that treatment with arsenite of soda in solutions of 0.01-0.02 per cent is more effective than the customary methods of applying polysulphides or powdered sulphur.—D. S. Welch.

4294. GARDNER, MAX W., and H. S. JACKSON. New aspects of apple blotch control. [Abstract.] Phytopathology 13: 44. 1923.

4295. GODFREY, GEORGE H. A *Phytophthora* footrot of rhubarb. Jour. Agric. Res. 23: 1-26. Pl. 1-12, 3 fig. 1923.—*Rheum rhaponticum* in many parts of eastern U. S. A. is affected. A sudden wilting of outer leaves in midsummer is the first indication. The leaf stalk is girdled at the base, decays very rapidly, and secondary invaders soon appear. The root soon becomes affected and the plant dies. The prevalence of the disease is correlated with wet, cloudy weather. The disease is caused by *Phytophthora parasitica* var. *rhei* n. var. The fungus is described and compared with all other species of the genus as to cultural characters, host range, morphology, etc.—Spraying with Bordeaux mixture appears to reduce infection and this material may be used with impunity since the disease appears after the rhubarb harvest. The disease is easily carried to new places in infected roots. Surface contamination of divided roots is easily prevented by wetting the roots thoroughly with formaldehyde (1-100) and covering them for several hours.—D. Reddick.

4296. GRAVES, ARTHUR H. The *Melanconis* disease of the butternut. [Abstract.] Phytopathology 13: 47. 1923.

4297. GREENWOOD, F. W. Collar rot in pea crops on the Wairau plain. Some causes and preventive measures. New Zealand Jour. Agric. 26: 35-37. 1 fig. 1923.—This disease, due to a species of *Fusarium*, has been very destructive to peas in certain sections, especially on sour or poorly drained soils. The use of lime is recommended. The disease does not appear to injure tares and these may be grown.—N. J. Giddings.

4298. HARRINGTON, J. B. Discussion of Hayes and Stakman's paper, "Wheat stem rust—from the standpoint of plant breeding." Proc. Western Canadian Soc. Agron. 2: 36-37 1921 [1922].—Suggestions are made as to important phases of the wheat stem rust problem needing further investigation, with special emphasis on the value of cooperation. [See following entry.]—Frederick V. Rand.

4299. HAYES, H. K., and E. C. STAKMAN. Wheat stem rust from the standpoint of plant breeding. Proc. Western Canadian Soc. Agron. 2: 22-35. Fig. 1-4. 1921 [1922].—The discovery of biologic forms of stem rust of wheat has given the breeding of rust-resistant varieties a definite scientific basis. Numerous tests of biologic forms in the urediniospore stage have furnished data showing the relative stability of the individual forms. Extensive tests with various biologic forms are suggested to determine whether or not genetic segregation occurs at the time of teleutospore formation. Forms which are heterogeneous and give the X type of reaction should be favorable material for such a study. Disease resistance in

plants is inheritable in the ordinary manner. After determining the number and prevalence of biologic forms of stem rust, these forms should be used in building up wheat varieties resistant to all forms of wheat stem rust. Definite cooperation between pathologists and breeders, and between different research institutions, is suggested. [See also preceding entry.] *Frederick V. Rand.*

4300. HENRY, A. W. Some fungi causing black point of wheat. [Abstract.] *Phytopathology* 13: 49. 1923.—In inoculation tests with several fungi black point was produced by *Helminthosporium sativum*, *H. sp.*, *Brachysporium*, and *Stemphylium*.—*B. B. Higgins.*

4301. HENRY A. W. The pathogenicity of *Fusarium moniliforme* Sheldon cereals. [Abstract.] *Phytopathology* 13: 52. 1923.

4302. HOPKINS, E. F. The *Sphaerulina* leaf spot of clover. *Phytopathology* 13: 117-126. Pl. 8-9, fig. 1-3. 1923.—A disease produced by *Sphaerulina trifolii* E. Rostr. on various species of *Trifolium* and not previously reported in America has been found rather generally distributed. The fungus was isolated and grown in cultures and successful inoculations with pure cultures were made on *Trifolium pretense* L. and on *T. repens* L. Gross inoculations were successful on these 2 species and also on *T. hybridum* L., *Medicago sativa* L., *M. maculata* Willd., *Melilotus alba* Lam., and *M. officinale* Willd. The disease is characterized by the appearance of very small black spots on the leaf blades, petioles, and stipules. These spots finally enlarge and become pale brown in color with dark brown margins. Perithecia develop abundantly in the old spots.—*B. B. Higgins.*

4303. HOWARD, NATHANIEL O. The relation of an undescribed species of *Pestalozzia* to a disease of *Cinnamomum camphora* Nees & Eberm. [Abstract.] *Phytopathology* 13: 47-48. 1923.

4304. JOHANN, HELEN, JAMES G. DICKSON, and GRACE WINELAND. Relation of environment to infection of corn seedlings by *Diplodia Zeae* (Schw.) Lev. [Abstract.] *Phytopathology* 13: 52-53. 1923.

4305. JOHNSTON, C. O. Wheat smut investigations in Kansas: Report of progress 1920-21. [Abstract.] *Phytopathology* 13: 36. 1923.

4306. JONES, L. R., J. C. WALKER, and E. C. TIMS. Work upon *Fusarium*-resistant cabbage in 1922. [Abstract.] *Phytopathology* 13: 57. 1923.

4307. KEMPTON, F. E. Progress in barberry eradication. [Abstract.] *Phytopathology* 13: 48. 1923.

4308. KROUT, WEBSTER S. Apple scab control in Massachusetts. [Abstract.] *Phytopathology* 13: 44. 1923.

4309. LAURITZEN, J. I., and L. L. HARTER. The relation of humidity to the infection of sweet potatoes by *Rhizopus*. [Abstract.] *Phytopathology* 13: 56. 1923.

4310. LEVINE, M. N., and E. C. STAKMAN. Biologic specialization of *Puccinia graminis* secalis. [Abstract.] *Phytopathology* 13: 35. 1923.

4311. LEVY, E. BRUCE. Investigation of dry rot of swedes. *New Zealand Jour. Agric.* 24: 336-343. Fig. 1-6. 1922.—Dry rot of swedes (*Phoma Napobrassicae*) is very prevalent. Soil treatment with various chemicals was tried but found impractical. The chief source of infection is soil in which a diseased crop has been grown. A 7-year rotation is suggested and it is advised that stock be kept off the field for 3 years preceding the swede crop so that the soil will not become infected through their droppings.—*N. J. Giddings.*

4312. LINK, GEO. K. K., G. B. RAMSEY, and ALICE A. BAILEY. *Botrytis* rot of the globe artichoke (*Cynara scolymus*). [Abstract.] *Phytopathology* 13: 58. 1923.

4313. MAINS, E. B. Evidence of the seed carriage of the *Euphorbia* rusts, *Uromyces proëminens* and *U. dictosperma*. *Proc. Indiana Acad. Sci.* 1921: 137-139. 1922.—Seed from plants of *Euphorbia dentata* heavily rusted with telia of *Uromyces proëminens* were planted. Seven plants out of 60 showed infection either with pycnia or aecia or with both. Aeciospores from these infected plants were sown on 5 uninfected plants and production of uredinia and telia of *U. proëminens* resulted upon capsules and leaves. The same kind of an experiment was carried out, using seed from plants of *Euphorbia arkansana* Eng. & Gr. heavily rusted with telia of *Uromyces dictosperma* Ellis & Ev. sent from Kansas. Eleven plants out of 42 showed infection. Uredinia and telia appeared later upon most of the plants. Aeciospores were sown on uninfected plants and uredinia and telia were produced. *U. dictosperma* is a full-cycled, autoecious species. It seems evident that both rusts are seed carried.—F. C. Anderson.

4314. MANGIN, L., et N. PATOUILLARD. Sur la destruction de charpentes au château de Versailles par le *Phellinus cryptarum* Karst. [Destruction of woodwork in the castle of Versailles by *Phellinus cryptarum*.] *Compt. Rend. Acad. Sci. Paris* 175: 389-394. *Fig. 1-4*. 1922.—In addition to this species there are found *Polyporus cryptarum* Fr., *Boletus cryptarum* Bull., *Polyporus undatus* Pers., *Coniophora membranacea*, and *Rhyncolus culinaris* Germ. The wood was chiefly of *Xestobium rufovillosum* Deg. and *Anobium domesticum* Geoffr. A microscopic study is made of the wood infested with *Phellinus cryptarum* Bull.—C. H. Farr.

4315. MARCLOUX, E. Mycose pulmonaire. [Pulmonary mycosis.] *Bull. Soc. Path. Exotique* 15: 919-920. 1922.—An abscess in the region of the right scapula of a Frenchman from French West Africa contained yeast cells and the pus from this abscess produced fatal tumors in guinea pigs. Attempts to culture the yeast failed. The author considered it suggestive of *Monilia*.—Philip Brierley.

4316. MEHTA, KARM CHAND. Observations and experiments on cereal rusts in the neighborhood of Cambridge, with special reference to their annual recurrence. *Trans. British Mycol. Soc.* 8: 142-176. 1923.—Field work was carried on for nearly 2 years to determine the relative importance of the various factors which go to explain the origin of rust outbreaks year after year. At the same time extensive culture work was carried on to throw light on the physiological differences between the yellow, brown, and black rusts of wheat. In black rust, *Puccinia graminis*, it was found that both uredospores and mycelium soon lose their vitality if exposed to winter weather and, also, that direct infection of wheat by sporidia is not possible. Hence it is concluded that annual outbreaks of this rust must be caused by fresh infection with aecidiospores from barberry. The uredospores of the brown and yellow rusts, *P. triticea* and *P. glumarum*, however, germinate well at any time during the winter and so may infect young wheat plants in spring. The culture work showed that in the case of black rust specialization is not so fixed as reported by some other workers but that the brown and yellow rusts are much more rigidly specialized.—W. B. McDougall.

4317. MELCHERS, L. E. and C. O. JOHNSTON. Corn root, stalk, and ear rot disease investigations in Kansas: Report of progress 1922. [Abstract.] *Phytopathology* 13: 52. 1923.—*Fusarium moniliforme* was found in abundance, but only traces of *Diplodia Zea* and *Gibberella Saubinetii*.—F. V. Rand.

4318. METCALF, HAVEN. White pine blister rust [*Cronartium ribicola* Fischer] in the Northwest. [Abstract.] *Phytopathology* 13: 46. 1923.

4319. NEWHALL, A. G. The importance of the *Phoma* stage of *Mycosphaerella rubina* causing spur blight of raspberries. [Abstract.] *Phytopathology* 13: 44-45. 1923.

4320. NEWTON, MARGARET. Biologic forms of wheat stem rust in Western Canada. *Proc. Western Canadian Soc. Agron.* 1: 34-35. 1920 [1921].—This constitutes a summary of a paper delivered by the author at Edmonton, Alberta, in 1920. By infection experiments she has shown that 11 distinct biological forms of wheat stem rust are present in Western Canada.—*Frederick V. Rand.*

4321. NOBÉCOURT, PIERRE. Sur le mécanisme de l'action parasitaire du *Penicillium glaucum* Link et du *Mucor stolonifer* Ehrb. [Mechanism of the parasitic action of *Penicillium glaucum* and *Mucor stolonifer*.] *Compt. Rend. Acad. Sci. Paris* 174: 1720-1722. 1922.—These fungi which are commonly saprophytes may affect various fruits and vegetables. Their destructive action is due to a substance secreted by the fungus diffusing through the flesh of the parasitized fruit. There are certain evidences that this substance is an enzyme as it is destroyed by a temperature above 60°C; its action ceases at 0°C, but recovers with a rise in temperature. Immunity to these fungi is not considered as due to resistance to this secretion.—*C. H. Farr.*

4322. OCFEMIA, G. O. Helminthosporium disease of rice. [Abstract.] *Phytopathology* 13: 53. 1923.

4323. PERRET, CLAUDE. La dessiccation prématurée des pieds de pommes de terre dans la Loire. [Wilt of the Irish potato in central France.] *Bull. Soc. Path. Vég. France* 9: 257-259. 1922.—Following the drought in 1921 and 1922 many potato plants wilted in the field as early as August. Wilted plants were infected by *Vermicularia varians* Duc.—*J. Dufrénoy.*

4324. P[ILICHOD]Y, A. Le "pourri" de la tige. (*Trametes Pini*.) (Ses manifestations dans les vieux peuplements de la vallée de Joux.) [The trunk "rot". Its manifestations in the old stands of the Joux River Valley.] *Jour. Forest. Suisse* 72: 223-226. 1921.—*Trametes Pini* is contrasted with *T. radiciperda*, the more prevalent of the 2. It is described in detail as to the host and the means of access, the characteristic decay, the spread radially and vertically, and the typical outward manifestations. In the old stands of the Joux River Valley the rot did not produce the typical sporophores, but the fruiting bodies were produced in the form of incrustations on the underside of dead branches, close to the trunk. The rot was, therefore, mistaken for either *Polyporus annosus* or a Fomes of the *F. roburineus* group. The rot was identified through microscopic examinations of the spores.—*G. Kempff.*

4325. S., G. N. Pine branch twist a fungus disease on pine (*Melampsora pinitorqua*). *Cyprus Agric. Jour.* 18: 19. 1923.—The author gives a description of the appearance of branches affected with the disease. Only 2 cases have been noted (in the Laphos forest in Cyprus, by the forest staff.—*W. Stuart.*

4326. SALMON, E. S., and H. WORMALD. A safe method of preventing "bunt" in wheat. *Jour. Ministry Agric. Great Britain* 29: 722-728. 1922.—Treating wheat with a solution of copper sulphate should be abandoned as a solution of the strength necessary to kill the spores of bunt seriously impairs the germination of the seed-wheat.—A better method consists of the use of a 1-480 aqueous solution of formalin. This is sprinkled slowly over the seed wheat at the rate of 1 gallon to 2 bushels of seed, the latter being stirred until the grains are all thoroughly wet. The seed is then placed in a heap, left covered for 4 hours with sacks wet with the formalin solution, and then spread out to dry in a thin layer on a clean floor. The treated seed when dry should be sown as soon as possible.—*M. B. McKay.*

4327. SCHOENE, W. J. The past, present and future of the cedar situation. *Proc. Virginia State Hort. Soc.* 1922: 42-46. 1923.—This is a discussion of the status of cedar eradication as a control measure for the cedar-rust disease of apples in Virginia.—*F. D. Fromme.*

4328. SHAPOVALOV, MICHAEL. Relation of potato skinspot to powdery scab. *Jour. Agric. Res.* 23: 285-294. *Pl.* 1-4. 1923.—Skinspot appears on the surface of potato tubers as "round,

raised, closed pustules frequently with a depressed border, single or in aggregates of varied configuration; dark-brown or bluish brown outside and olive brown to brown inside." The name "skinspot" has no right to existence except as a matter of convenience, for the lesions are essentially and primarily the closed or immature sori of *Spongospora subterranea*. The range of this disease coincides with that of *Spongospora* scab. Secondary invaders such as *Oospora pustulans* in England, *Phoma eupyrena* in Germany, *Phoma tuberosa* in Maine, or *Colletotrichum atrementarium* in Pennsylvania, etc., do not contribute to the production of the lesions.—D. Reddick.

4329. SHARPLES, A. A preliminary account of observations on the fungi causing "Brown root" disease. *Malayan Agric. Jour.* 10: 181-183. 1922.—There are 3 morphologically different fungi associated with "brown root" disease: those of the brown root disease of camphor and of the Ceylon brown root disease seem to be species of *Hymenochaete*; whereas the brown root disease of Malaya has a fungus which resembles a *Corticium*.—I. H. Burkill.

4330. SPAULDING, PERLEY. Foreign studies of white pine blister rust. [Abstract.] *Phytopathology* 13: 45. 1923.

4331. SPIEKERMANN. Wie kann die weitere Verbreitung des Kartoffelkrebses in Deutschland verhindert werden? [How can the further spread of potato canker be prevented in Germany?] *Mitteil. Deutsch. Landw. Ges.* 38: 117. 1923.—The use of resistant varieties is said to be the only solution. The following are given as potato varieties partly or wholly immune: Parnassia, Pepo, Hindenburg, Arnika, Jubel, Preussen, Thieles, Earliest, Kuckuck, Magdeburger Blue, Paulsens July.—A. J. Pieters.

4332. STAHEL, GEROLD. Bijdrage tot de kennis der krullotenziekte. [Contribution to the knowledge of witches brooms.] *Dept. Landb. Suriname Bull.* 39: 34 p., 8 pl. 1919.—The disease is caused by *Marasmius perniciosus*. It was not possible to infect cocoa-buds by the mycelium taken from witches brooms. The basidiospores have to pass the cuticle or the stoma. A description is given of inoculation of the cocoa fruits. Most petrified fruits are found in May and June. In pure cultures it was never possible to obtain fruiting bodies. The mycelia form a dense mass on agar; white at first and later red, they become lemon-yellow in the full light. When placed out-of-doors in shaded pots, the mycelia become red within 2 to 3 days and produce fruiting bodies during rainy weather after 10 days. The hymenia produce but few spores in the morning, most of them being formed between 6 and 12 P.M. During the last 15-20 years the witches broom disease has caused much loss in Surinam to cocoa trees. The disease is at present eradicated by removing the witches brooms, petrified fruits, and diseased flowers every 3-4 weeks.—J. C. Th. Uphof.

4333. STAHEL, GEROLD. De Sclerotium-ziekte van de Liberiakoffie in Suriname veroorzaakt door *Sclerotium coffeicolum* nov. spec. [The Sclerotium disease of Liberia coffee in Surinam caused by *S. coffeicolum* n. sp.] *Dept. Landb. Suriname Bull.* 42. 34 p., 11 pl. 1921.—Previous to 1917 the Sclerotium disease caused no damage, but in that year it became dangerous in Upper Surinam. The fungus is found on the leaves and the berries of Liberia, canephora, excelsa, and Abeocuta coffees where it causes brown spots hardly 0.5 cm. in diameter, with conspicuous concentric rings. By artificial inoculation the disease was also induced on the Robusta, Uganda, Mocca, and Surinam coffee varieties, but it grows only poorly on the varieties not belonging to the Liberia group. The fungus cannot attack the berries until they are about three quarters grown. It develops only in the exocarp and mesocarp and does not enter the seed, the latter germinating normally. The sclerotia are orange to brown externally, white within, flat, and up to 0.5 cm. broad. Dead berries which have fallen to the ground are sometimes entirely covered with sclerotia. On the fruit they are flattened, but larger than those on the leaves. It was not found possible to germinate the sclerotia artificially. On the underside of the leaves small "spines" are formed which are easily scattered by the wind and are composed of bundles of hyphae 5 to 8 μ in diameter. These spines are

connected with each other by many anastomoses. No spore formation has ever been found on these spines but pure cultures were made from them. They grow readily in acid but not in alkaline media. It is characteristic that the fungus itself lives only in dead tissue, the only actively parasitic period in its life being that of its entry through the cuticle or stomata. The mycelium probably excretes oxalic acid which kills the cells in the vicinity of the advancing hyphae, the latter subsisting upon the resulting dead cells. *Sclerotium coffeicolum* n. sp. is apparently related to *S. Rolfsii*.—*J. C. Th. Uphof*.

4334. STAHEL, GEROLD. De Zuid-amerikaansche Hevea-bladziekte op de rubberplantage der "Lawa Caoutchouc Compagnie." [Hevea leaf-disease in Lawa.] *West Indie* 4: 63-64. 1919.—The South American Hevea leaf-disease, caused by *Melanopsammopsis Ulnei* makes Para rubber culture impossible. The "Compagnie des mines d'or" near Lawa, having a plantation of 120-130 hectares, was entirely ruined by it. This plantation was 120-150 m. above sea level. In 1918 the Hevea hills were often covered with heavy fogs, causing the disease to become epidemic within 6 months. One third of the trees were killed on account of the resulting loss of young leaves. The top of the eastern slope of hill subject to northeast winds was less liable to the disease than the western slope where fog and dew remain longer. The original host of the fungus seems to be *Hevea guyanensis*, which occurs in the forests of Surinam.—*J. C. Th. Uphof*.

4335. STAKMAN, E. C., M. N. LEVINE, AND D. L. BAILEY. Biologic specialization of *Puccinia graminis avenae*. [Abstract.] *Phytopathology* 13: 35. 1923.

4336. TAPKE, V. F. Modified and simplified hot-water and vapor treatments for the control of loose smut in wheat, with special reference to seed injury. [Abstract.] *Phytopathology* 13: 38. 1923.

4337. TAUBENHAUS, J. J., AND D. T. KILLOUGH. Recent studies on control methods of Texas root rot. [Abstract.] *Phytopathology* 13: 33. 1923.—The disease affects not only cotton but also various weeds such as *Ipomoea trichocarpa*.—*F. V. Rand*.

4338. TAYLOR, MINNIE W. White pine blister rust infection through grafted roots. [Abstract.] *Phytopathology* 13: 46. 1923.—*Cronartium ribicola* Fischer.

4339. THOMPSON, NOEL F. Eradicating the common barberry by means of chemicals. [Abstract.] *Phytopathology* 13: 48. 1923.

4340. WALTON, R. C., AND C. R. ORTON. Time of apple blotch infection for 1922 in southern Pennsylvania. [Abstract.] *Phytopathology* 13: 43-44. 1923.—*Phyllosticta solitaria*.

4341. WEBER, GEORGE F. III. Septoria disease of rye, barley and certain grasses. *Phytopathology* 13: 1-23. *Fig. 1-9*. 1923.—In this paper Septoria leaf blotch of (1) rye, (2) barley, (3) quack grass, (4) brome grass, and (5) Kentucky blue grass are described; and a general summary and discussion of the results reported in the 3 papers is given. The disease on rye (*Secale cereale*) is caused by *Septoria Secalis* Prill. & Del. Only the leaves are attacked, producing irregular spots, in size ranging from small and almost circular to large areas often involving the entire leaf. This widely distributed disease is apparently limited to rye but does not seem to be of economic importance. The disease on barley (*Hordeum vulgare*) is caused by *Septoria Passerinii* Sacc., which attacks the leaf sheath and the leaf blade, producing indefinite yellowish areas which blend gradually into the normal green of the leaf. Inoculation tests indicate that the host range is limited to species and varieties of *Hordeum*. It has not proved of economic importance. The disease on quack grass (*Agropyron repens*) is caused by *Septoria Agropyri* E. & E. The infected leaves soon turn yellowish, die, and turn brown. In inoculation experiments infections were produced on plants of *Agropyron*

repens only. The disease on brome grass (*Bromus inermis*) is caused by *Septoria Bromi* Sacc. The infected leaves turn yellow, dry, and die prematurely. Infections were produced on *Bromus inermis* only, though other species of *Bromus* were not inoculated. A disease of Kentucky blue grass (*Poa pratensis*) produced by an unidentified species of *Septoria*, has been found at Madison, Wisconsin. Small, circular to oval spots are produced on the leaf blades. The disease is apparently different from that produced by *Septoria gramineum* Desm. Of the 8 species of *Septoria* studied, 6 are sharply specialized to the host on which they were found. The other 2, *S. Tritici* and *S. nodorum* are less specialized, since both attack wheat, rye, and *Poa pratensis*.—B. B. Higgins.

4342. WENIGER, WANDA. Pathological morphology of durum wheat grains affected with "black point." [Abstract.] *Phytopathology* 13: 48-49. 1923.—The disease is due to *Helminthosporium sativum* P. K. & B.—F. V. Rand.

4343. WHETZEL, H. H. The *Alternaria* blight of potatoes in Bermuda. *Phytopathology* 13: 100-103. Fig. 1. 1923.—A severe attack of early blight (*Alternaria Solani*) on potatoes (*Solanum tuberosum*), occurring in Bermuda in the early winter of 1921, is described. The unusual features noted were the suddenness and rapidity of development of the disease, the completeness of the destruction of the plants, the size of the lesions and their similarity to late blight lesions, and the occurrence of large water-soaked areas on the stems.—B. B. Higgins.

4344. WOOLMAN, H. M. Cytological studies on the infection of wheat seedlings by *Tilletia Tritici* (Bjerk.) Wint. [Abstract.] *Phytopathology* 13: 36-37. 1923.

DISEASES CAUSED BY BACTERIA

4345. ANDERSON, P. J. Controlling tobacco wildfire in the seed-bed. [Abstract.] *Phytopathology* 13: 59. 1923.

4346. BROWN, NELLIE A. Bacterial leafspot of geranium in the eastern United States. *Jour. Agric. Res.* 23: 361-372. Pl. 1-3. 1923.—A leafspot of cultivated geraniums (*Pelargonium* spp.) is widespread in greenhouses and occurs occasionally in the field. It is most commonly found on cuttings or on plants that are being forced.—The disease is caused by *Bacterium Pelargonii* n. sp. The organism is described in detail and is compared with *B. Erodii* Lewis which it resembles in many details. Infections were produced under warm, moist conditions and poor ventilation. The disease disappears when these growth conditions are corrected.—D. Reddick.

4347. BROWN, NELLIE A. Experiments with Paris daisy and rose to produce resistance to crown gall. *Phytopathology* 13: 87-99. Pl. 3-4, fig. 1-4. 1923.—Two attempts were made to develop resistance to *Bacterium tumefaciens* Sm. & Towne. in the Paris daisy by taking cuttings from galled plants through successive generations. The plants were inoculated through needle pricks. After galls were well developed, cuttings were made from the galled stems. After these cuttings had started growth and were developing rapidly they were likewise inoculated. No decided resistance was developed; in fact the plants were gradually devitalized. Those of 1 series died in the 5th and the other series in the 7th galled generation. With roses several crosses were made between commercial varieties. The plants were inoculated and the seed allowed to develop on galled stems. Of the resulting seedlings only 1 (Mrs. Charles Russell × Sunburst) showed evidence of resistance. By the end of 2 years this resistance had been lessened so that the plants from this cross also galled readily.—B. B. Higgins.

4348. CLINTON, GEORGE P., AND FLORENCE A. McCORMICK. Wildfire of tobacco in Connecticut. *Connecticut Agric. Exp. Sta. Bull.* 239. 365-423. Pl. 29-32. 1922.—A tobacco disease survey during the period 1920-1921 disclosed the presence of the bacterial leaf-spot disease, wildfire (*Bacterium tabacum*), in Hartford, Tolland and Litchfield Counties, with the

greatest center of infection north of Hartford in Hartford County. The possible methods of the introduction and further dispersal of the disease in the State are pointed out. The appearance of the diseased plants both in the seed bed and in the field is described at length. Control measures are suggested as follows: (1) sterilize beds, boards, and sash of the seed bed or use beds made on new uninfected land; (2) use seed from a field free of wild fire; (3) use as little water on plants as will give good growth, and air the beds day and night when feasible; (4) spray the plants with 4-4-50 Bordeaux mixture; (5) set out the fields with plants from uninfected beds; (6) a week after setting out remove diseased plants, repeating the process 7-10 days later; (7) badly infected fields should be plowed and reset with healthy plants; (8) with primed tobacco the infected and non-commercial leaves may be removed and destroyed.—A bibliography of 34 numbers is included.—*Henry Dorsey.*

4349. LEVINE, MICHAEL. Studies in plant cancers. V. Leafy crown galls on tobacco plants resulting from *Bacterium tumefaciens* inoculations. *Phytopathology* 13: 107-116. *Pl.* 5-7. 1923.—Tobacco plants were inoculated with *Bacterium tumefaciens* in the leaf axils, in the stem internodes, and in the midrib of the leaves. A trocar, 0.5 millimeter in diameter, was inserted and the tissue removed and replaced by a drop of the bacterial suspension. Leafy crown galls resulted from many of the inoculated leaf midribs and from inoculated stem internodes as well as from the inoculated leaf axils. These leafy crown galls were of 2 types. Those produced on the leaf midribs and on the stem internodes evidently resulted from differentiation in the crown gall tissue, while some of those in the leaf axils resulted from abnormal growth of the axillary bud. The latter type was larger, with a more distinct stem. Occasionally both types developed in a single leaf axil.—*B. B. Higgins.*

4350. QUANJER, H. M., EN J. HUDIG. De aardappelschurft met betrekking tot klimaat en bodem. [Potato scab in relation to climate and soil.] *Cultura* 35: 1-12. 2 pl., 1923.—Potatoes fertilized with superphosphate and sulphate of ammonia were smooth, but the addition of a small amount of marl resulted in a slight amount of scab. Slag, nitrate of soda, and marl gave very scabby tubers. The tubers become scabby on alkali land but healthier when the land is acid.—*J. C. Th. Uphof.*

4351. REDDY, CHARLES S., AND JAMES GODKIN. A bacterial disease of brome-grass. *Phytopathology* 13: 75-86. *Pl.* 1-2. 1923.—A new disease of brome grass (*Bromis inermis*) occurring in Wisconsin and North Dakota, has been under investigation during the past 3 years. On the leaves spots are produced which are at first light olive-green, circular to elliptical water-soaked areas with light brown centers. Later the color changes to a dark chocolate or purplish-brown. Old spots are usually linear but often coalesce and destroy the entire leaf. The disease is produced by a non-motile, rod-shaped *Bacterium* similar morphologically to *Bacterium coronafaciens* Elliott. It differs from this species in pathogenicity on certain hosts and in the character of the spots produced. It is therefore described as *Bacterium coronafaciens* Elliott var. *atropurpureum* n. var. The organism has also been found parasitizing quack grass (*Agropyron repens*), and by artificial inoculation has been caused to attack oats (*Avena sativa*) and various species of *Bromus*.—*B. B. Higgins.*

4352. RIKER, A. J. Some morphological responses of the host tissues to the crown-gall organism. [Abstract.] *Phytopathology* 13: 43. 1923.

4353. RIKER, A. J. The location of the crown-gall organism in its host tissues. [Abstract.] *Phytopathology* 13: 43. 1923.

4354. SANFORD, G. B. The potato scab problem. *Proc. Western Canadian Soc. Agron.* 2: 71-81. 1921 [1922].—This discussion includes the history of the problem, description of the causal organism (*Actinomyces scabies*), its relation to temperature, the factors concerned in its distribution, methods of scab prevention, and disease resistant varieties.—The organism is present in all normal soils, especially those rich in organic material. The irregularity in

the results of control measures suggests other more important factors in controlling or favoring the disease; from experimentation and observation it is suspected that moisture is 1 of these.—*Frederick V. Rand.*

4355. TAYLOR, W. H. Tomato diseases. Black-stripe and its control. New Zealand Jour. Agric. 26: 101-103. 1923.—Black stripe disease (*Bacillus lathyri* Manns and Taub.) of tomatoes, causing serious losses to tomato growers, is largely influenced by the kind and amount of fertilizer used. Excess nitrogen or heavy manuring favor the disease, but it may be overcome by applications of sulphate of potash used at the rate of about $\frac{1}{4}$ ounce per plant.—*N. J. Giddings.*

4356. VALLEAU, W. D. An important period in the life history of two bacterial organisms causing leaf-spots on tobacco. Phytopathology 13: 140-144. Fig. 1. 1923.—Observations on seedbed infection of tobacco plants with angular leaf spot and wildfire led to the belief that the causal bacteria, when introduced on the seed or otherwise, multiply rapidly in the seedbed soil and attack the leaves which lie in contact with this infested soil. It seemed possible, therefore, that the addition of some toxic agent might prevent this multiplication of the bacteria in the soil. In an experiment in which sulphur was added to the soil at the rate of 500, 1000, and 2000 pounds per acre, no leaf spot appeared in any of the treated plats, while it developed abundantly in a control plat receiving no sulphur. Because of injury to the stand in the treated plats, the use of sulphur is not recommended.—*B. B. Higgins.*

4357. VRIEND, J. Stachytarpheta vatbaar voor Slijmziekte. [Stachytarpheta susceptible to slime sickness.] Deli-Proefsta. Medan. Vlugschrift 16. 4 p., 1 fig. 1922.—The author showed by infection experiments that the bacterial wilt disease of tobacco and tomato also attacks the common verbenaceous weed *Stachytarpheta indica* Vahl.—*A. J. Pieters.*

4358. WATERS, R. Fireblight. New Zealand Jour. Agric. 24: 350-357; 25: 209-214. Fig. 1-9. 1922.—A brief history of the disease, its distribution, hosts, methods of dissemination, character and results of inoculation experiments are given. A new insect carrier (*Sephesta cinerea*) is reported. The problem of fireblight control in New Zealand is seriously complicated by the great number of hawthorn hedges. Special legislation has been enacted giving the government authority to adopt such measures as may seem essential in orchard sections.—*N. J. Giddings.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

4359. BAUNACKE, W. Untersuchungen zur Biologie und Bekämpfung des Rübenne-matoden *Heterodera schachtii* Schmidt. [Investigations of the biology and control of the rape nematode *Heterodera schachtii*.] Arbeit. Biol. Reichsanst. Land- u. Forstw. 12: 185-288. Pl. 1-5. 1922.—The nematode question in Germany is more than ever one of great agricultural importance. The wide occurrence of the rape malady, and the power of *Heterodera schachtii* for rapid adaptation, reproduction, and dissemination, endanger the culture of other important crops. Practical means for the extermination of the nematodes in diseased soil have not been known heretofore.—The brown resting cysts are the carriers of the disease. The content of these cysts in the soil and the depth of their occurrence indicate the degree of disease. The larvae escaping from the cysts at once seek the host plants. This larval behavior permits the use of bait both in examination of the soil for infestation and for control. With the aid of the larvae in the cysts, the parasitic inclinations of stocks of *Heterodera* upon cultivated plants can be ascertained.—The behavior of wandering larvae is influenced by thermal and chemical stimuli. Unfavorably high or low soil temperatures check their energy and cause them to become quiescent. Favorably warm temperatures increase their activity to a maximum, the latter being reached at 25°C. The concentration of water-soluble metabolic products of host plant roots, decreasing with distance, is perceived as a positive stimulus. The precision of larval movement from remote distances to the host plant, as well as the power to distinguish sharply unaccustomed or unsuitable food plants, finds its explanation in

this finely marked chemical sensitivity. Larvae remaining latent in the interior of cysts and embryos enclosed within eggs are also in a high degree sensitive to these thermal and chemical stimuli. The use of these chemical stimuli in a way corresponding to natural events makes it possible to bring newly formed 1-summer cysts to complete emptiness in a few weeks, where otherwise a year is required. The evacuation of the cysts takes place apart from the host plant, under the influence of root excretions alone.—A small number of highly specialized strains of *Heterodera* retain general powers of adaptation. They make possible the preservation of the species under altering conditions of existence, as well as the rapid adaptation to new host plants. The tenacious persistence of the nematodes in soil is explained by the extremely many-sided system of species preservation and distribution by which the parasites progress in development under favorable conditions but resist those that are adverse.—Control measures are directed against the resting cysts. The chief mass of these may be destroyed in autumn by sprinkling the ground just before the plow with a 1 per cent solution of ammonia (this may be concentrated to 2 per cent where water is scarce). In conjunction with this treatment, it is recommended that a stimulative crop (i.e., one that the nematodes especially prefer) be sown thickly as soon as the productive crop is cleared away. This stimulative crop, growing during the chief developmental period of the parasites, activates the deep-lying cysts, which are destroyed by the disinfection that follows. These control measures are to be repeated the next year, and until examination of the soil shows no infestation.—*W. S. Beach.*

4360. CORY, ERNEST N. Dusting for the pea aphid. Jour. Econ. Entomol. 16: 81-84. 1923.—Dusting is most promising for pea aphid control. The principal tests were to determine the most effective percentage of nicotine. A high nicotine content and not less than 30 pounds of dust per acre are preferable. The use of a trailer of canvas is advised. There should be at least 50 per cent of the vines infested when dusting is begun.—*Author's abstract.*

4361. DELONG, D. M. Results of spraying and dusting for the control of the red spider (*Paratetranychus pilosus*). Jour. Econ. Entomol. 16: 8-90. 1923.—A lime sulphur wash, 1-40, easily controls red spider, though it is too strong for prune foliage, which at times may be seriously injured by 1-75. The control by various sulphur dusts in combination with arsenate of lead or nicotine did not vary greatly, ranging from 50 to 60 per cent. Soap added to a lime-sulphur wash, increases its value by at least 5-10 per cent. A 1-per cent lime-sulphur with 6 pounds of sulphur paste for each 100 gallons and 1 pound of resin fish oil soap gave very satisfactory control.—*From Author's Abstract.*

4362. FRANCHINI, G. Action du latex d'Euphorbes sur différents trypanosomes. Culture de flagellés dans des latex divers. [Action of the latex of Euphorbias on different trypanosomes. Culture of flagellates in the latex of various plants.] Bull. Soc. Path. Exotique 16: 41-50. 1923.—Five species of *Trypanosoma* from blood of man or of animals lived longer in glass slide mounts in fresh Euphorbia latex than in physiological solution or citrate solution.—Three species of *Herpetomonas*, 2 of *Trypanosoma*, and 1 other flagellate were cultivated in autoclaved latex or latex plus bouillon. Growth was obtained in latex of 6 species of Euphorbiaceae, 4 of Apocynaceae, 2 of Asclepiadaceae, 2 of Urticaceae, 1 of Artocarpeae, and 2 of Sapotaceae. None of the organisms grew in latex of Menispermaceae (1 species) or Anacardiaceae (1 species) tried, and *Herpetomonas Ctenocephali* grew in none of the latex tried. *Trypanosoma Lewisi* changed to Crithidian and Herpetomonad forms more quickly in latex than in N. N. N. medium, and *T. Gambiense* soon formed leishmaniform parasites. Flagellates cultured in latex sometimes showed evident changes of form. *Herpetomonas pyrrocoridis* cultured in latex of *Euphorbia calyculata* sometimes showed an oval swelling of the anterior extremity and a spiral twisting of the body. Such swelling and twisting has been observed in the flagellates found in fresh latex of *Euphorbia*, but has not appeared before in *Herpetomonas pyrrocoridis* during 3 years of culture in various media.—*Philip Brierley.*

4363. FRANCHINI, G. Essais d'inoculation au chat d'amibes du latex de plantes. [Trial inoculations of cats with amoebae from plant latex.] Bull. Soc. Path. Exotique 15: 931-933. Fig. 1. 1922.—Amoebae from the latex of *Acokanthera venenata* and *Plumeria alba* (Apocynaceae) caused temporary sickness in 2 kittens when inoculated into the rectum. Amoebae were not infrequent in the feces during the period of sickness and some of them had ingested red blood corpuscles. When the kittens recovered, amoebae were no longer found. Inoculation of a 3rd kitten with a culture from the latex of *Ficus carica* "very poor in amoebae" was without result.—Philip Brierley.

4364. FRANCHINI, G. Protozoaires de Muscides divers capturés sur des euphorbes. [Protozoans of various Muscidae collected on Euphorbias.] Bull. Soc. Path. Exotique 15: 970-978. Fig. 1-4. 1922.—Protozoans were abundant in the digestive tracts of flies (*Sarcophaga*, *Muscina*, *Graphomyia*, *Anthomyia*) visiting *Euphorbia palustris* near Bologna, Italy. Flagellates were most common, but forms resembling "gregarines libres" and spirochetes were also seen; some of these forms are figured. Some stages of these flagellates resemble the forms described from *Euphorbia* latex. Latex of *Euphorbia* was recognized in the digestive tract of *Anthomyia*. Droplets of latex extruded from the corolla may become mingled with feces of visiting flies; transfer of flagellates in the feces of flies is thus suggested. The 3 plants on which insects were collected were "very vigorous"; no protozoans were detected in the latex except that leishmaniform parasites were occasional in 1 plant.—Philip Brierley.

4365. HINDS, W. E., and F. L. THOMAS. Poisoning the boll weevil. Alabama Agric. Exp. Sta. Bull. 212. 51-84. 1920.—The results indicate that power dusting and hand dusting are profitable for low-yielding and even more profitable for high-yielding cotton. It was found that moisture supplied by fine spray does not increase the killing efficiency of arsenate of lead. Every effort should be made to continue dusting at 4- or 5-day intervals in spite of threatening weather.—Wright A. Gardner.

4366. KINSEY, ALFRED C. Life histories of American Cynipidae. Bull. Amer. Mus. Nat. Hist. 42: 319-357. Pl. 28-31. 1920.—The paper gives descriptions of plant-galls but is principally a discussion of the life histories of the insects causing them.—Frank E. Lutz.

4367. KINSEY, ALFRED C. New Pacific Coast Cynipidae (Hymenoptera). Bull. Amer. Mus. Nat. Hist. 46: 279-295. Pl. 24. 1922.—This paper gives descriptions of plant-galls and the insects causing them.—Frank E. Lutz.

4368. KINSEY, ALFRED C. New species and synonymy of American Cynipidae. Bull. Amer. Mus. Nat. Hist. 42: 293-317. Pl. 20-27. 1920.—This paper gives descriptions of plant-galls but principally of the insects causing them.—Frank E. Lutz.

4369. KINSEY, ALFRED C. Phylogeny of Cynipid genera and biological characteristics. Bull. Amer. Mus. Nat. Hist. 42: 357a-c, 358-402. Pl. 32. 1920.—This paper is chiefly concerned with the insects causing plant-galls.—Frank E. Lutz.

4370. MARIÉ, P. Influence des coupes de bois faites en 1920-1921 sur le développement des Scolytidae propres au Chêne. [Influence of cuttings on the spread of the oak Scolytidae.] Bull. Soc. Path. Vég. France 9: 306-311. 1922.—The year 1921 was the driest in France for centuries, the rainfall having been less than half that of normal years. Where cuttings were made, the oaks left standing suffered much from sun exposure and were readily attacked by *Xyleobius monographus* Fabr. and *Platypus cylindrus* Fabr., beetles which preferably invade trees exposed to the sun.—J. Dufrénoy.

4371. PARROTT, P. J., and HUGH GLASGOW. The insecticidal properties of tobacco dust. Jour. Econ. Entomol. 16: 90-95. 1923.—The insecticidal properties of tobacco dust on an average were not uniformly as high as that of dust mixtures containing nicotine sulphate.

The concentrated tobacco solutions are apparently more economical than powdered tobacco.
—*From Author's abstract.*

4372. SASSCER, E. R., and C. A. WEIGEL. Further data on fumigation with hydrocyanic acid gas in greenhouses on a commercial basis. *Jour. Econ. Entomol.* 16: 84-87. 1923.—The formula used was 1 ounce averdupois sodium cyanide, $1\frac{1}{2}$ liquid ounces sulphuric acid (1.83 specific gravity), and 3 fluid ounces of water. Frequent 1-hour exposures in a greenhouse containing a large number of different plants, were followed by no permanent injury, though temporary burning occurred on such plants as *Jasminum*, *Salvia*, etc., and the insects were practically eliminated except mealy bugs and these greatly reduced by the killing of immature larvae. Results are also given for the fern scale, the camphor scale, and the Florida red scale.—*Author's abstract.*

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

4373. ATANASOFF, D. A. A study into the literature on stipple-streak and related diseases of potato. *Mededeel. Landbouwhoogeschool Wageningen* 26¹: 52 p. 1922.—The writer divides the literature into 2 periods: (1) 1775 to 1900 and (2) 1900 to 1922.—*J. C. Th. Uphof.*

4374. ATANASOFF, D. A. Stipple-streak disease of potato. *Mededeel. Landbouwhoogeschool Wageningen* 24⁵. 32 p., 5 pl. 1922.—In Holland the stipple-streak disease has been seen on a number of varieties. On *Schotsche muis*, *Atlanta*, *Duke of York II*, and *Early Potato*, all early sorts, it has been observed in epidemic form, 20-75 per cent of the plants being infected. In other varieties the disease has been sporadic. In some fields in the Province of North Holland over 75 per cent of the plants were heavily infested or dead before the end of May. On the vines the symptoms of primary stipple-streak vary more or less according to variety, being more numerous and more pronounced in the early, succulent, and light green varieties. The symptoms are at first several, and later more uniformly distributed, dark brown to black, slightly sunken spots between the veins of the lower or middle leaves. Tubers of some varieties at time of digging may be apparently healthy, but when kept for some time, usually 2-3 weeks or longer, show the presence of the disease. In other cases the tubers show distinct pathological effects including pronounced blisters, and early shrinkage. Many tubers from stipple-streak plants never form sprouts. This disease, like leaf-roll and mosaic, is a systemic disease. Sometimes the pathogen, travelling down the infected plant, passes through the mother tuber into the base of the still healthy sister shoots and outward through the stolons into their tubers before reaching other aerial portions. Experiments showed conclusively that the pathogen cannot pass from plant to plant through the soil, water, or air. Thus far it has been possible to transmit this disease from infected to healthy plants only by creating an organic connection between them, as by grafting or by joining sections of healthy and infected tubers. Temperature has a very marked influence upon the appearance and development of stipple-streak, a low temperature retarding the disease. Positively infected tubers disinfected in 2 per cent copper sulphate for 1-2 hours, and in 2 per cent mercuric chloride for 30 minutes, when planted gave secondary disease in all cases. When heated in dry air at 44-46°C. for 5-24 hours a similar result was obtained. Prompt and careful elimination of the infected tubers and young plants showing the disease will be an effective control measure.—*J. C. Th. Uphof.*

4375. BRANDES, E. W. Mechanics of inoculation with sugar-cane mosaic by insect vectors. *Jour. Agric. Res.* 23: 279-283. *Pl.* 1-2. 1923.—Insects feeding on sugar-cane leaves were killed *in situ* and histological examinations made. *Aphis maidis*, a known carrier of mosaic, usually pushes its beak through a thin place in the cuticle of the guard cell of a stomate, then either directly through or between the mesophyll cells, through the starch sheath and into the phloem. Throughout the process of penetration there is a copious salivary secretion. This secretion is thought to be the specific medium by which the infective principle is introduced into the plant. *Peregrinus maidis* and *Draeculacephala mollipes*, neither of which is known to transmit the disease, do not seem to seek the phloem in particular but the large size

of their setae as compared with vascular bundles is such as to preclude a positive statement.—*D. Reddick.*

4376. CHARDON, C. E., and R. A. VEVE. The transmission of sugar cane mosaic by *Aphis maidis* under field conditions in Porto Rico. *Phytopathology* 13: 24-29. *Fig. 1.* 1923.—Although the experiments of Brandes and others have shown that *Aphis maidis* is able to transmit the infective principle of sugar cane mosaic, the fact that this insect is rarely found on sugar cane has caused considerable doubt as to its being responsible for the spread of the disease in the field. Inspection showed that aphids were present in practically every cane field in Porto Rico, not on the cane itself, but on various wild grasses in the fields. When the fields were weeded and the wild grasses killed the aphids passed to the cane, congregating in the central whorl of leaves. This was followed by a sudden increase in mosaic infection. This migration of the aphids and their transmission of cane mosaic has been demonstrated experimentally. Of the wild grasses growing in an experimental cage with diseased cane, 3 (*Syntherisma sanguinalis* Eleusine indica, and *Echinochloa colona*) developed typical mosaic symptoms.—*B. B. Higgins.*

4377. DICKSON, B. T. Temperature studies in mosaic diseases. [Abstract.] *Phytopathology* 13: 42. 1923.

4378. DICKSON, B. T., and E. G. HOOD. Temperature studies in mosaic diseases. [Abstract.] *Phytopathology* 13: 42. 1923.

4379. FERNOW, KARL H. A new host for potato mosaic. [Abstract.] *Phytopathology* 13: 40-41. 1923.—*Nicandra physaloides* is the new host plant under discussion.—*B. B. Higgins.*

4380. FERNOW, KARL H. Spindling tuber or marginal leaf-roll. [Abstract.] *Phytopathology* 13: 40. 1923.

4381. LINK, GEO. K. K. Mosaic and leaf roll of the potato in the Northwest. [Abstract.] *Phytopathology* 13: 39. 1923.

4382. MCKINNEY, H. H., SOPHIA H. ECKERSON, and R. W. WEBB. Intracellular bodies associated with a "mosaic" of *Hippeastrum Johnsonii*. [Abstract.] *Phytopathology* 13: 41-42. 1923.

4383. MCKINNEY, H. H., SOPHIA H. ECKERSON, and R. W. WEBB. Intracellular bodies associated with the rosette disease of wheat. [Abstract.] *Phytopathology* 13: 41. 1923.

4384. MACMILLAN, H. G. Potato mosaic masking at high altitudes. [Abstract.] *Phytopathology* 13: 39. 1923.

4385. NELSON, RAY. The occurrence of protozoa in plants affected with mosaic and related diseases. [Abstract.] *Phytopathology* 13: 41. 1923.

4386. NEWHALL, ALLEN G. Seed transmission of lettuce mosaic. *Phytopathology* 13: 104-106. 1923.—Field observations led to the belief that lettuce mosaic was seed-transmitted, and careful greenhouse tests demonstrated the correctness of this belief. Seed saved from diseased lettuce plants were planted in steam-sterilized soil and covered with cheesecloth to prevent access of insects. Twenty-four days later 45 of the 1,465 plants from these seed showed typical symptoms of mosaic.—*B. B. Higgins.*

4387. SALMON, E. S. The "mosaic" disease of the hop. *Jour. Ministry Agric. Great Britain* 29: 927-934. *Fig. 1-3.* 1923.—"The 'mosaic' disease of the hop—which is apparently similar in many respects to the well-known 'mosaic' disease of the potato, tomato, tobacco

and other plants—is proving extremely destructive and very contagious. The hop plant once attacked never recovers and is usually killed in one or two seasons; an infected plant not grubbed up serves as a source of infection which quickly spreads the disease.—Observations have shown that the disease can be carried in the cuttings of hop-plants.—The systematic ‘rogueing’ of hop gardens in early summer and again just before hop picking is recommended to prevent the spread of the disease.”—*M. B. McKay*.

4388. SCHULTZ, E. S., and DONALD FOLSOM. Spindling-tuber and other degeneration diseases of Irish potatoes. [Abstract.] *Phytopathology* 13: 40. 1923.

4389. WEBER, GEORGE F. Mosaic disease of sweet potato. [Abstract.] *Phytopathology* 13: 42-43. 1923.

PARASITIC PHANEROGAMS

4390. DELACOSTE, F. Le gui sur l'épicéa. [The mistletoe on spruce.] *Jour. Forest. Suisse* 73: 90-91. 1 fig. 1922.—In 1918 the oak mistletoe (*Viscum album*) was discovered by the author for the first time on *Picea excelsa* in a forest of Saxon, Valais, and also very recently near St. Maurice at 600 m. altitude, with dry soil and northeastern exposure, in a stand composed of Scotch pine, white fir, larch, and Norway spruce. It was found in large and numerous brooms on the first 2 species, not at all on the 3rd, and in exceptional cases on the 4th.—*G. Kempff*.

4391. HENRICHER, E. Mistelträger im Botanischen Garten zu Innsbruck. [Hosts of mistletoes in the botanical garden at Innsbruck.] *Ber. Deutsch. Bot. Ges.* 39: 291-295. 1921.—In 1910 the author made sowings of seed of *Viscum album* on a number of plants. This paper reports 30 species, which had mistletoe plants growing upon them in 1921, representing the following genera: *Pinus*, *Abies*, *Larix*, *Picea*, *Salix*, *Populus*, *Betula*, *Carpinus*, *Corylus*, *Alnus*, *Loranthus*, *Viscum*, *Pyrus*, *Crataegus*, *Rosa*, *Cytisus*, *Robinia*, *Tilia*, *Fraxinus*, *Olea*, and *Syringa*.—*W. C. Muenzner*.

4392. KORSTIAN, CLARENCE F., and W. H. LONG. The western yellow pine mistletoe: effect on growth and suggestions for control. U. S. Dept. Agric. Bull. 1112. 85 p., 5 pl., 4 fig. 1922.—*Pinus ponderosa* Laws. is subject to severe injury by mistletoe (*Razoumofskya cryptopoda* Engelm.), resulting in serious losses and presenting one of the most important silvicultural problems in the Southwest. “Mistletoe infection causes a marked decrease in the rate of growth of the host, which continues until the virulent parasite ultimately causes the death of the tree.” The decrease in the growth rate of the tree is accompanied by a reduction of the leaf surface, and the trees are rendered practically worthless for seed production. The most practical method of control is to remove the infected tree while cutting operations are in progress. A sanitation clause should be inserted in timber-sale contracts when the areas contain much mistletoe, requiring the cutting of all heavily infected or marked moderately infected trees whether merchantable or unmerchantable, and when the entire stand is too heavily infected the areas should be marked for clear cutting under a mistletoe control project. On areas of light to moderate infection diseased trees should be marked for removal and “exceptional care should be taken to leave as heavy a stand of healthy trees as possible in order to compensate for the removal of diseased trees and to maintain better forest conditions.”—*J. T. Buchholz*.

4393. MORRIS, A. Some notes on mistletoes. *Australian Forest. Jour.* 5: 325-327. 1922.—The hosts are given for several species of mistletoe belonging to the genus *Loranthus*. Double parasitism is common; *L. exocarpi* grows upon *L. pendulus* and *L. quandang*.—*C. F. Korstian*.

NON-PARASITIC DISEASES

4394. BROWN, H. D., and MAX W. GARDNER. Lightning injury to tomatoes. *Phytopathology* 13: 147. *Fig. 1.* 1923.

4395. GARD, MÉD[ÉRIC]. Sur le dépérissement des jeunes noyers en 1922. [Die-back of young walnut trees.] *Bull. Soc. Path. Vég. France* 9: 263-266. 1922.—The killing of twigs, the cortex of which blackens and oozes a black liquid, is ascribed to frosts in November.—*J. Dufrénoy.*

4396. HARTER, L. L., J. I. LAURITZEN, and J. L. WEIMER. Internal breakdown of sweet potatoes. *Phytopathology* 13: 146-147. 1923.—A pithy condition of sweet potatoes [*Ipomoea batatas* L.] is apparently caused by storage conditions.—*B. B. Higgins.*

4397. RHOADS, ARTHUR S. The formation and pathological anatomy of frost rings in conifers injured by late frosts. U. S. DEPT. Agric. Bull. 1131. 15 p., 6 pl. 1923.—Pathological anatomy of late-frost injury has been studied in detail in 17 conifer species and in apple and pear trees. Characteristic disturbances in the tissue of the growth rings are produced, or extra rings, called *frost rings*, may form at the time of the injury. The injuries involve crumpling of the tender wood cells, a broadening and proliferation of medullary rays with or without their lateral displacement, the presence of radial clefts subsequently filled up by large-celled parenchyma, and more or less broad zones of wound parenchyma. Frost rings may be caused by late or early frost or by freezing of the cambium during the winter when the tree is dormant. Young shoots injured by late frost may wilt and upon recovery bend the point upward, resulting in permanently distorted stems, or they may be killed outright to be replaced by 1 to several volunteer shoots. Late frost injury when occurring after a considerable portion of the growth ring has been formed, results in a false or double ring, very confusing in age determinations. This late frost injury has not been observed in coniferous stems of greater diameter than 2 inches but occurs in larger stems of fruit trees subject to frost injury. Frost rings constitute a plane of weakness in the wood predisposing to the formation of circular shake as well as rendering the wood less valuable where great strength is required in small manufactured pieces.—*J. T. Buchholz.*

4398. SHARPLES, A. A consideration of recent work on the brown bast problem. *Malayan Agric. Jour.* 10: 155-170. 1922.—The author concludes that this disease of the Para rubber tree, *Hevea brasiliensis*, is of physiological origin, non-transmissible, and increased by heavy tapping.—*I. H. Burkill.*

4399. WATERS, R. Apple flesh-collapse or brown-heart. Some recent investigational work. *New Zealand Jour. Agric.* 25: 334-340. 1922.—Experimental evidence to date indicates that brown heart is due in part to the conditions of cool storage and in part to the maturity of fruit and its method of handling previous to storage. It is believed that intermittent cooling will give better results than running the plant continuously.—*N. J. Giddings.*

4400. WATERS, R. Cool storage of apples. *New Zealand Jour. Agric.* 25: 34-39. 1922.—This is an investigation of flesh collapse. This disease, a breaking down of the internal tissues, is very prevalent. Investigations indicate that it is partly due to cold storage conditions.—*N. J. Giddings.*

DISEASES OF UNKNOWN CAUSE

4401. BIOLETTI, FREDERIC T. Black measles, water berries and related vine troubles. *California Agric. Exp. Sta. Bull.* 358. 509-524. 1923.—The theory advanced is based chiefly on observations of the 2 great epidemics, of sporadic cases occurring in many districts over a period of many years, and on a consideration of the coincident environmental conditions in the various cases. It is, briefly, that these diseases are entirely or primarily the effect on the

vines of an excess of output over income and the resulting condition of starvation or malnutrition. The remedies offered are those which naturally suggest themselves if this theory is accepted. They are based on the principle of affording some means of keeping a proper balance between the demands on the vine and its ability to perform, and consist on the one hand in measures tending toward its invigoration, such as improvements in irrigation, cultivation, soil treatment, and the control of known pests and diseases; and on the other in measures tending toward apportioning the amount of crop on the individual vine, arm or cane, in accordance with its size, vigor, and condition of nourishment. The principal, perhaps the sole, measures that can be used for the latter purpose are various degrees and kinds of pruning which determine the number of fruit buds on which a vine is allowed to expend its energies.—Vines showing water berries and black measles, if still alive and showing even a small growth of mature wood and no extensive dead parts, may usually be saved by short pruning (down to base-buds in severe cases) and by fertilization and other cultural measures which tend to invigorate the plants.—*A. R. C. Haas.*

4402. DUFRÉNOY, JEAN. Sur la tuméfaction et la tubérisation. [On the formation of tumors and tubers.] *Compt. Rend. Acad. Sci. Paris* 174: 1725-1727. *Fig. 1-3.* 1922.—Observations are made on *Eucalyptus eugenoides* and on *Arbutus Unedo*. The tumors are found to be very rarely bacterial. Both hyperplasia and hypertrophy occur.—*C. H. Farr.*

4403. GARD, M. Sur le dépérissement des jeunes noyers en 1922. [The decay of young walnut trees in 1922.] *Compt. Rend. Acad. Sci. Paris* 175: 716-718. 1922.—This is a recently discovered disease causing decay of the aerial part of the entire tree. It occurs in spring and early summer on trees 10-20 years old, and in some cases on trees 50-60 years old. A description of the external and internal lesions is given. No parasitic organism was found present in all lesions. Similar effects were also noted to a less degree on figs, noble laurel, and grape.—*C. H. Farr.*

4404. HARTER, L. L., J. I. LAURITZEN, and J. L. WEIMER. Mottle-necrosis of sweet potatoes. *Phytopathology* 13: 145-146. *Fig. 1.* 1923.—A disease of sweet potatoes, characterized by the presence of brown necrotic areas in the tissue of the fleshy roots, was rather abundant about Washington, D. C., during 1922.—*B. B. Higgins.*

4405. LEE, H. ATHERTON. Sereh disease of sugar cane in Singapore. *Phytopathology* 13: 145. 1923.—The sereh disease was found at Singapore Botanical Garden on sugar cane introduced from Java. Attention is called to the danger incurred in importing cane from Java, because of the serious cane diseases which occur there.—*B. B. Higgins.*

4406. MCCLINTOCK, J. A. Aerial galls of peach. [Abstract.] *Phytopathology* 13: 45. 1923.

4407. STAHEL, GEROLD. De zeefvatenziekte (Phloëmnecrose) van de Liberiakoffie in Suriname. [Phloemnecrosis of Liberia coffee in Surinam.] *Dept. Landb. Suriname Bull.* 40. 40 p., 5 pl. 1920.—Phloemnecrosis in Surinam shows 2 forms: (a) the acute form formerly called root disease, and (b) the chronic form. In the acute form all of the apparently healthy leaves suddenly wither without first becoming yellow. Within a few weeks the entire tree is dead. It is characteristic that the black, dead leaves do not drop off as they are unable to form a schizophellogen layer at the base of the petiole. The rootlets are black instead of white as in the healthy trees. In the chronic form the trees do not die suddenly but the leaves become at first light green or yellowish and the old leaves drop off without withering. Only the youngest leaves which are abnormally small remain. Afterwards they wither and die without dropping off. Between these extremes there are intermediate forms. In cutting off diseased plants the wood remains connected with the bark. Diseased trees do not show any starch in the roots and stem. The disease can be controlled only by growing resistant types. The disease is mostly present on bearing trees 4-5 or more years old. No organism causing the disease was found.—*J. C. Th. Uphof.*

4408. WENIGER, WANDA. Studies on the causes of stem-end discolorations of potato tube[r]s in North Dakota. [Abstract.] *Phytopathology* 13:55. 1923.

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

4409. ANONYMOUS. Verslag over het jaar 1919 van het Departement van den Landbouw in Suriname. [Report for the year 1919, Department of Agriculture, Surinam.] 78 p. Paramaribo, 1919.—Reports of the different experiment stations and laboratories are contained. Certain districts were much affected by heart-rot of the coconut palm, and the area had probably been infected for 5 years. *Theobroma pentagonum* or Lagarto cocoa showed great immunity against *Marasmius perniciosus* causing witchbrooms. This *Theobroma* species is more closely related to *T. cacao* than to *T. bicolor* and *T. speciosum*. A 20-acre field planted with *Agave sissalina* produced 463,950 leaves, weighing 232,850 kgm. and yielding 8,755 kgm. of fiber. A report is given on malachra and Sea Island cotton. The native *Elaeis guineensis* suffered much from a heart-rot.—*J. C. Th. Uphof*.

4410. ALLEN, W. J., and W. LE GAY BRERETON. Some suggestions on spray management. *Agric. Gaz. New South Wales* 34: 129-134. 3 fig. 1923.—Practical suggestions are given in the mechanics of spraying relative to waste of material in transport, efficient use of outfit, facilities for mixing, and other factors.—*L. R. Waldron*.

4411. ANDERSON, O. G., and F. C. ROTH. Insecticides and fungicides, spraying and dusting equipment: a laboratory manual with supplementary text material. xvi + 349 p., 71 fig. John Wiley & Sons: New York, 1923.—“This manual is designed to offer instruction in the preparation of insecticides and fungicides; the construction, selection, testing and operation of spraying and dusting equipment.” The material is assembled primarily for collegiate use but with the hope that it will also be useful in vocational schools and in a limited way to those engaged in practical and commercial horticulture. The subject is presented in a simple form so as to be understood by readers with a limited knowledge of chemistry. Stress is laid on the value of spraying as compared with other control measures. In addition to the standard control measures, special ingredients, methods and equipment are discussed with the reasons for rise or decline in their usefulness.—*Lillian C. Cash*.

4412. BAILEY, E. M., and R. E. ANDREW. Report on commercial insecticides and fungicides. Connecticut Agric. Exp. Sta. Bull. 242. 147-165. 1922.—A report of materials sold as insecticides and fungicides is given, including a total of 95, 80 of which were examined and analyzed in 1922. In the 2nd part recent developments in the use of insecticides are discussed. It is pointed out that arsenate of lead in the dry form is used almost to the exclusion of paste. Nicotine sulphate has come into almost universal use since 1907. The order of combination of spray materials for best results is given.—*Henry Dorsey*.

4413. BLODGETT, F. M. Hot water and hot air treatments of potatoes. [Abstract.] *Phytopathology* 13: 55. 1923.

4414. BRITTON, W. E., M. P. ZAPPE, and E. M. STODDARD. Experiments in dusting versus spraying on apples and peaches in Connecticut in 1921. Connecticut Agric. Exp. Sta. Bull. 235. 208-226. Pl. 17-22, fig. 7-11. 1922.—Dusting is compared with spraying in 4 apple orchards with 757 trees and in 2 peach orchards with 263 trees. The equivalents of 334 barrels of apples and of 1,715 baskets of peaches were scored. Niagara dusting machines and Friend and Arlington X.L. power sprayers were used. Sulphur-lead dust, sulphur-lead-nicotine dust and Sanders' dust were compared with liquid lime-sulphur, lead arsenate, and nicotine sulphate on apples. In nearly all cases the best apples were secured from the sprayed plots. Both spray and dust controlled codling moth and chewing insects but the spray was more effective in controlling fungous diseases. On peaches atomic sulphur was used as a spray and was compared with sulphur and sulphur-lime-lead arsenate dusts. The dusted peaches were slightly better. Peach scab and brown rot were controlled by both dust and spray.

Dusting is at present more expensive than spraying in both peach and apple orchards.—*Henry Dorsey*.

4415. BRUMPT, E[MILE]. *Précis de parasitologie*. 3rd ed., xv + 1216 p., 4 pl. (col.), 736 fig. Masson et Cie.: Paris, 1922.—The first part of this much enlarged edition is given up to a general discussion of methods of investigation and scientific nomenclature, parasites, relation of parasite with host, adaptation of parasites, and parasitic maladies.—The remainder of the work deals with specific parasites under the following headings: pathogenic protozoa (Spirocheta, Rhizopoda, Sporozoa, Flagellata, Infusoria); medical helminthology (Trematoda, Cestoda, Nematoda); arthropod parasites (Arachnida, Hemiptera, Diptera); and medical mycology (Hyphomycetes, Ascomycetes, Phycomycetes). The important parasites are discussed as to synonymy, description, habitat, life-history, transmission, and pathology (pathogenesis).—*Frederick V. Rand*.

4416. DODGE, E[THEL] M[ARY]. *Some common diseases of tomato*. 24 p., 11 fig. The Specialty Press of South Africa, Ltd.: Johannesburg, Capetown, 192-?.—In a popular manner this book discusses leafspot due to *Septoria Lycopersici* Speg., blossom-end rot attributed to physiological causes, bacterial wilt due to *Bacterium Solanacearum* EFS, late blight or downy mildew caused by *Phytophthora infestans* DeB., early blight due to *Macrosporium Solani* Ell. & Ev., sleepy disease or wilt (*Fusarium* sp.), anthracnose (*Colletotrichum phomoides* (Sacc.) Chester), and fruit rot (*Phoma destructiva* Plowr.). The signs of the disease, a brief description of the organism, and control measures are given.—*Lillian C. Cash*.

4417. GREMAUD, EDUARD. *Maikrankheit und Dotterblume*. [May disease in bees and the marsh marigold.] Schweiz. Bienenzeitg. 44:88. 1923. This is a statement concerning the possibilities of infection of May disease from *Caltha palustris*. The author traces all his trouble in beekeeping to this cause.—*M. G. Dadant*.

4418. HIGGINS, B. B. Seed treatment in the control of pepper diseases. [Abstract.] *Phytopathology* 13: 57-58. 1923.

4419. KOTILLA, J. E., and G. H. COONS. Spraying and dusting of potatoes in 1922 at Chatham, Michigan. [Abstract.] *Phytopathology* 13: 54-55. 1923.

4420. MASSEE, GEORGE, and FRED. V. THEOBALD. *The enemies of the rose*. The National Rose Society's handbook on the fungus and insect pests of the rose. New ed., 110 p., 8 pl. (col.), 6 fig. Westminster, S. W., [no date].—A popular account of the diseases caused by fungi is given by Massee with a description of mildew (*Sphaerotheca pannosa*), black mildew (*Peronospora sparsa*), rust (*Phragmidium subcorticatum*), black spot (*Actinonema Rosae*), leaf-scorch (*Septoria Rosae*), sooty mold (*Fumago* sp.), parasitic rose canker (*Coniothyrium Fuckelii* Sacc.), and chlorosis. In each case preventive measures are given.—The insect enemies are treated by Theobald, who gives in each case a description of the pest, its life history and habits, and remedies to be applied.—*Lillian C. Cash*.

4421. NEWELL, WILMON. Report of the plant commissioner. Quart. Bull. State Plant Bd. Florida 7: 75-148. Fig. 1-2. 1923.—A general account is given of nursery inspection in Florida, and the activities of the quarantine department.—The sugar cane variety Cayana 10 is mentioned as being highly resistant to mosaic.—Much attention has been given to the eradication of the citrus canker, which occurred in several counties.—*J. C. Th. Uphof*.

4422. NORTH, D. S. The control of sugar cane diseases. Australian Sugar Jour. 14: 687-693. 1923.—This is the 1st of a series of papers on the Australian sugar cane diseases. Australia probably has more serious diseases attacking its cane than any other country. This has been caused by the wholesale, unrestricted importation for 50 years of varieties from abroad without precautionary measures against the introduction of diseases and insect

pests.—Gumming (*Bacterium vascularum* (Cobb) Grieg-Smith), mosaic, red rot (*Colletotrichum falcatum* Went.), and true rust (*Uromyces Kuhnii* Kruger) were introduced with cuttings at an early date. Gumming probably came from Brazil and Mauritius. The Fiji disease (cause unknown), leaf stripe (*Sclerospora Sacchari* Miy.), and leaf scald (*Bacterium* sp.) are suspected of being importations from New Guinea. Besides these better known diseases, cane has been severely affected from time to time by top rot (cause unknown), curly top (cause unknown), knife cut (cause unknown), and certain root and leaf diseases not yet thoroughly investigated. Many minor diseases of leaf, leaf sheath, stem, and root also occur, introduced doubtless with cuttings, largely from New Guinea. It is believed that almost every disease must have been introduced to every cane district. No reason can be given why the Fiji disease has never become established at the Colonial Sugar Refining Company's Queensland mills, while it has been for so long a time highly destructive at the New South Wales mills and in Fiji; or why leaf stripe has not been found in New South Wales or the Childers district, while prevalent at Mackay and all the districts to the north and in Fiji.—Sometimes a disease has been eradicated by the introduction of an immune variety of cane. Thus, the gumming disease which devastated the crops of nearly every mill, has now apparently disappeared from Harwood and Condong, and it has not been heard of from Fiji for several years. On the other hand, gumming is increasing at the Broadwater, Victoria, and Macknade mills, is reappearing at Childers and in scattered small areas elsewhere.—Finding a disease-resistant variety of cane is not the only nor always the best way of combatting a disease of cane. With the new varieties come new diseases. A sugar cane, if properly cared for, can be propagated by cuttings for 150 years and probably longer without degeneration; for example, Lehaina, which is still the chief variety of irrigated plantations on the Hawaiian Islands. It is susceptible to diseases, and was eliminated from cultivation for this reason; but after the diseases in question had disappeared it was reestablished as the standard cane. Similarly, Badilia was attacked by the Fiji disease; but with the control of this disease it has continued to be cultivated. Badilia has been introduced into Australia in the place of superior varieties of cane because it is considered highly resistant to diseases. However, it is not universally immune, for it is too susceptible to gumming for planting at Broadwater, and it is somewhat susceptible to mosaic, leaf stripe, and leaf scald.—*Caroline Rumbold*.

4423. [O]RTWIJN, BOTJES, J., and H. M. QUANJER. Dutch potato varieties resistant to wart disease and internal brown spot. [Abstract.] *Phytopathology* 13: 54. 1923.

4424. OSMUM, A. V., and P. J. ANDERSON. An improved formaldehyde tank for the onion drill. [Abstract.] *Phytopathology* 13: 58. 1923.

4425. PEYRONEL, B. Come avviene e come si previene la diffusione delle malattie crittogamiche delle piante. [The dispersion of cryptogamic parasites and means of control.] *Boll. Mens. R. Staz. Patol. Veg.* [Rome] 2: 119-124. 1921; 3: 3-20. 1922.—This is an extensive review of the literature, without bibliographic citations. The subject is discussed under the following heads: spread from plant to plant in a specific locality, dissemination by means of water, by wind, by animals, and in or upon the tissues of the host.—*D. Reddick*.

4426. RAMSAY, A. A. A home-made tobacco wash for combined sprays. *Agric. Gaz. New South Wales* 34: 58-60. 1923.—Home-made tobacco wash, made by extracting waste tobacco with boiling water, is unsatisfactory when used combined with such a spray as lime-sulphur because of flocculent precipitations. This trouble has been avoided by extracting the tobacco waste in the cold with lime water and then straining. The cost of the preparation is given.—A treble-purpose spray comprising lead arsenate, home-made tobacco wash, and lime-sulphur has been found efficient with no significant increase in amount of soluble arsenic.—*L. R. Waldron*.

4427. RAMSAY, A. A. Storage experiments with lime intended for sprays. Results for the completed period of trial. *Agric. Gaz. New South Wales* 34: 69-70. 1923.—Freshly

slaked lime stored under water for a period of 1 year underwent practically no deterioration, the increase of calcium carbonate being only 0.8 per cent.—*L. R. Waldron*.

4428. REDDICK, DONALD. Ito's potato variety Ekishirazu in New York. [Abstract.] *Phytopathology* 13: 55-56. 1923.—The variety is resistant to *Phytophthora infestans* but susceptible to mosaic.—*F. V. Rand*.

4429. SAMUEL, GEOFFREY. Notes on forest pathology from South Australia. *Australian Forest Jour.* 5: 189-192, 223-226, 253-254. 7 fig. 1922.—The economic importance of tree diseases is emphasized. The present pathological condition of the South Australian pine forests is discussed under the following headings: (1) general observations on growth, (2) "curly needle" disease, and (3) fungus diseases. Experiments were carried out to test the parasitism of *Sphaeropsis* and *Pestalozzia* sp. on *Pinus insignis*. These organisms were found not to be responsible for the disease under consideration. The abnormal types of growth are believed to be due to physiological causes. *Armillaria mellea* is mentioned as a root rot.—*C. F. Korstian*.

4430. SCHNEIDERHAN, F. J. Scab and other things. *Proc. Virginia State Hort. Soc.* 1922: 153-174. 1923.—An analysis of representative lots of cull apples at Winchester, Virginia, showed the cause of culling to be as follows: 53.9 per cent due to fungous diseases, 25.7 per cent to insect pests, and 20.4 per cent to other factors. Scab (*Venturia inaequalis*) was the most important single factor, 30.9 per cent being culled from this cause. A survey of spraying practices indicated that orchards in general are insufficiently equipped for satisfactory work and that the number of spray applications made is insufficient for satisfactory control of diseases and insects. The pink application was found to be of greatest value in scab control. The calculated values of the 4 early-season applications in scab control are as follows: delayed dormant, 3; pink, 41; calyx, 33; 2-weeks, 12.—*F. D. Fromme*.

4431. SMITH, RALPH E., and JOSEPH P. MARTIN. A self-mixing dusting machine for applying dry insecticides and fungicides. *California Agric. Exp. Sta. Bull.* 357. 497-505. Fig. 1-3. 1923.—It should not be assumed that the use of this machine will entirely take the place of factory-mixed dust. The idea at present applies only to a large power machine and is impracticable where hand machines are employed, or in any small scale work. Furthermore, many growers prefer ready-made material to anything which requires accurate measurement and mixing of materials in the field. The self-mixing machine, by increasing the practise of dusting, promises to supplement and extend the use of ready-made mixtures rather than to supplant or lessen their use.—*A. R. C. Haas*.

4432. SOUTH, F. W. Regulations controlling the importation of plants into the Straits Settlements, the Federated Malay States and Johore. *Malayan Agric. Jour.* 10: 228-233. 1922.—This constitutes an exact statement of the rules controlling the importation of plants in force on Oct. 31, 1922.—*I. H. Burkill*.

4433. STEARNS, L. A., and W. S. HOUGH. Spreader tests on apples and peaches. *Proc. Virginia State Hort. Soc.* 1922: 55-59. 1923.—Casein and flour-paste spreaders did not increase the efficiency of spray mixtures in the control of fungous diseases and insect pests of apple and peach. The spray mixtures employed were lime-sulphur for the early applications on apple, and Bordeaux mixture for the late applications. Atomic sulphur was used on peaches.—*F. D. Fromme*.

4434. STUART, WILLIAM. The potato: its culture, uses, history and classification. ix + 518 p., frontispiece + 267 fig. J. B. Lippincott: Philadelphia and London, 1923.—Of this monographic work 101 pages are devoted to potato diseases and their control; insect and animal parasites of the potato and methods of controlling them; fungicides and insecticides, their preparation, use, application, and resultant benefits; spray equipment and classifi-

cation.—Classification and treatment of the parasitic and non-parasitic diseases are first given in tabular form. This tabulation is followed by a discussion of each specific disease, including such data as distribution, symptoms, methods of infection, source of infection, preventive measures and their results, etc. In this manner the main facts are given concerning 17 parasitic and 5 non-parasitic diseases of the potato and their control.—Insect parasites of the potato are treated under (1) leaf-chewing and mining insects; (2) stem- and tuber-eating insects; and (3) sucking insects. Following a tabulation of some 14 of these insects (and the eelworm) with control measures, each is brought under detailed discussion.—The chapter following gives a classification of fungicides and insecticides, with detailed descriptions, and directions for mixture and use.—*Frederick V. Rand.*

4435. TISDALE, W. B. Tobacco diseases in Gadsden County in 1922. Florida Agric. Exp. Sta. Bull. 166. 77-118. Fig. 14-28. 1922.—A description is given of tobacco diseases in Gadsden County, Florida. The common practice in Florida of covering the plant beds with cloth protects the seedlings from insects and no doubt prevents mosaic infection. Most growers also cut the stalks as soon as they have finished priming, which reduces the number of infected plants for insects to feed on. Clearing out the edges of shades, as is practiced by some growers, destroys insects and the source of mosaic infection.—Root-knot is the cause of serious damage; badly infested plants may be entirely killed, especially during the dry season. Except in badly infested areas there is only a slight amount of dwarfing and the yield is but little reduced. Infested fields usually show irregular growth of plants. Wildfire caused by *Bacterium tabacum* Wolf & Foster was reported in Florida in 1921; it spreads rapidly from leaf to leaf. The age of the plant and the weather conditions modify the appearance of the spots. It usually makes its appearance in the plant bed before the plants are ready for transplanting. During rains the wildfire germs are washed out of the diseased tissues of the host plant and are splashed on healthy leaves above and on nearby healthy plants. For control the seedbed should be disinfected before planting. Tobacco seed can be conveniently disinfected by tying loosely in a muslin bag and immersing for 10 minutes in a solution (1-1000) of corrosive sublimate or formaldehyde (1 fluid ounce to 1 pint of water). Used cloth over the beds should be avoided. The plants should be sprayed with 4-4-50 Bordeaux mixture or a dust, such as that of Sanders.—Granville wilt caused by *Bacterium Solanacearum* E. F. S. is very serious. None of the tobacco strains showed any promising degree of resistance. Leafspot caused by *Phyllosticta Nicotianae* E. & E. is very limited in distribution and of minor importance. Specking, due probably to *Cercospora Nicotianae* E. & E. was very prevalent in 1922, but in fields where the leaves could be primed early the crop suffered very little damage; where rains delayed priming it caused considerable loss. It does not occur on vigorous, rapidly growing plants. Whenever growth is checked the disease appears on the lower leaves and advances upwards. The variety Big Cuba is recommended for planting.—Root-rot caused by *Thielavia basicola* (B. & Br.) Zopf. is found in the shaded tobacco fields of Florida and was widespread in 1922. Connecticut Round Tip is highly resistant, while Big Cuba is susceptible. The difference in growth of Big Cuba plants in badly infested fields indicates a difference in degree of resistance between individual plants. A few growers have started selection for resistance.—Black Shank, very likely caused by *Phytophthora Nicotianae* de Haan, has appeared in recent years and is very serious. The varieties Connecticut Round Tip and White Burley are most susceptible. No definite and practical method of control is offered. In Gadsden County the grower moves to new fields. Experimental steaming of several acres of land has demonstrated that the organism can be eradicated from the soil but this method is too expensive to be practical.—*J. C. Th. U'phof.*

4436. TISDALE, W. H., and J. W. TAYLOR. Organic mercury seed disinfectants. [Abstract.] Phytopathology 13: 38. 1923.

4437. YOUNG, H. C. Sulphur as a fungicide. I. Colloidal sulphur. [Abstract.] Phytopathology 13: 60. 1923.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 3663, 3782, 3791, 4113, 4215, 4489, 4490)

4438. ANONYMOUS. *Nos plantes médicinales de France.* [Medicinal plants of France.] 8 pl. Comité Interministeriel des Plantes Médicinales et à Essences: Paris, 1923.—The following plants and their floral and fruiting parts are depicted in colors: *Sarothamnus scoparius* Koch., *Aconitum napellus* L., *Papaver rhoeas* L., *Viola odorata* L., *Bryonia dioica* Jacq., *Digitalis purpurea* L., *Solanum dulcamara* L., and *Sambucus nigra* L. Accompanying each of the plates is an account of the synonyms, parts used, description of plant, time of flowering, collection, preparations, properties, and uses.—H. W. Youngken.

4439. ANNETT, H. E., and M. N. BOSE. *Studies in the meconic acid content of Indian opium.* Mem. Dept. Agric. India Chem. Ser. 6: 215-221. 1922.—It would seem that the physiological process whereby alkaloids are produced in the opium poppy produces meconic acid in amount equivalent to the alkaloids.—J. Sen.

4440. ASTON, B. C. *The poisonous, suspected, and medicinal plants of New Zealand.* New Zealand Jour. Agric. 26: 78-79. 1923.—Members of the Leguminosae, Rosaceae, Saxifrageae, Myrtaceae, Passifloreae, Umbelliferae, Rubiaceae, and Compositae are discussed.—N. J. Giddings.

4441. BALFOUR, ANDREW. *Oil of Chenopodium [and] cultivation of Chenopodium plant.* In: Report on Medical and Sanitary Matters in Mauritius, 1921, 22 p. Waterlow & Sons Ltd.: London, 1922.—*Chenopodium ambrosioides* var. *anthelminticum* is generally regarded as the most satisfactory vermifuge in ankylostomiasis. It grows plentifully in Mauritius, where it is known as Botrys. Yields of oil from local plants proved low. The native plant is being placed under cultivation and high-class seed from the U. S. A. is being secured. Soil and climate appear to be well suited to successful cultivation of the plant.—J. R. Schramm.

4442. BLACK, O. F., W. W. EGGLESTON, J. W. KELLY, and H. C. TURNER. *Poisonous properties of Bikuculla cucullaria (dutchman's breeches) and B. canadensis (squirrel corn).* Jour. Agric. Res. 23: 69-78. Pl. 1. 1923.—*Bicuculla cucullaria* and *B. canadensis* have been considered poisonous to cattle in Virginia, which is confirmed for the former by preliminary feeding experiments on yearling steers. Chemical examination shows that the tops and roots of both species contain toxic alkaloids. Dilutions of the total alkaloids were subcutaneously injected into mice, with the result that it is estimated that *B. cucullaria* is about 6 times as toxic as *B. canadensis*. A highly poisonous and heretofore apparently unknown alkaloid, cucullarine, was found in *B. cucullaria*; its properties are described.—W. C. Muenscher.

4443. CARY, C. A. *Poisonous action of red buckeye on horses, mules, cattle, hogs, and fish.* Alabama Agric. Exp. Sta. Bull. 218. 20 p. 1922.—A description of *Aesculus pavia* L. and a report of tests on the effects of different parts of this plant on several animals are presented. While pigs, mules, cattle, and fish exhibited some symptoms of poisoning when fed parts of the plant, none were killed or permanently injured.—W. A. Gardner.

4444. CHAUVIN, E. *Sur la toxicité de Volvaria gloiocephala DC.* [On the toxicity of *Volvaria gloiocephala*.] Compt. Rend. Acad. Sci. Paris 175: 1231-1233. 1922.—This species was considered deadly until recently, when Gautier reported it not toxic in Algeria. The author tested specimens, collected in France, on dogs, guinea pigs, and on himself, with no ill effects. He hesitates to declare it entirely non toxic, as individuals differ in susceptibility, and specimens are liable to differ according to the soil upon which they grow. *Amanita junquilla* proved slightly toxic at certain seasons.—C. H. Farr.

4445. DALMIER, E., et OLIVEAU. Trois cas simultanés di empoisonnement grave par *Amanita pantherina*. [Three cases of severe poisoning by *Amanita pantherina*.] Bull. Trimest. Soc. Mycol. France 38: 100-105. 1922.—Typical muscarine poisoning of the cerebral type has been caused by eating *Amanita pantherina* mixed with harmless mushrooms.—D. S. Welch.

4446. GREENISH, HENRY G. Microscopical examination of foods and drugs. 3rd ed., xx + 389 p., 209 fig. P. Blakiston's Son & Co.: Philadelphia, 1923.—The subject matter of this book is divided into 15 sections and 2 appendices in which the following topics are considered: starches, hairs and textile fibers, spores and glands, ergot, woods, stems, leaves, flowers, barks, seeds, fruits, rhizomes, roots, adulterants of powdered foods and drugs, general scheme for the examination of powders, reagents of general utility, and varieties of cell walls and cell contents and their identification. Several new methods of microtechnique have been introduced, including a process for the disintegration of tissues by maceration with chromic and nitric acids.—H. W. Youngken.

4447. NELSON, J. C. The bracken as a poisonous plant. Amer. Fern. Jour. 12: 125-127. 1922.—*Pteridium aquilinum* (L.) Kuhn. var. *pubescens*, a weed in the Northwest, has been found poisonous to horses. The poisonous property seems to be due to a "fixed oil, insoluble in water," which is found in many ferns. The eradication of the fern seems impossible due to its deep-seated and drought-resistant rhizome.—F. C. Anderson.

4448. OFFNER, J. Empoisonnement par des champignons secs. [Poisoning by dried fungi.] Bull. Trimest. Soc. Mycol. France 38: 106-108. 1922.—There have been many cases of poisoning from eating mushrooms preserved by drying. It is suggested that a strict supervision should be placed on the industry of collecting and drying of fungi for market.—D. S. Welch.

4449. TANERT, G. Seigle ergoté falsifié. [Adulterated ergot.] Répertoire Pharm. 35: 69-71. 1923.—About 17 per cent of the samples of ergot sold as coming from Sapin consisted of black grains with a grayish-yellow fractured surface. The taste of the article was farinaceous, and the adulterant sank in water. The adulterant consisted of masses of wheat starch paste passed through narrow apertures, and after being broken into suitable lengths, the fragments were colored by immersion, first in red and then in black ink.—H. W. Youngken.

4450. TERRY, O. P. Treatment of Rhus poisoning. Proc. Indiana Acad. Sci. 1921: 141. 1922.—The article describes a method of using Tincture of grindelia for Rhus poisoning.—F. C. Anderson.

4451. ULLMANN, A. Ueber Tyramin (p-Oxyphenyläthylamin) als wirksamen Bestandteil der Droge Semina cardui Mariae (Stechdistelkörner). [Tyramine (p-hydroxyphenylethylamine) as the active principle of the drug Semina cardui Mariae (Cardul thistle seeds).] Biochem. Zeitschr. 128: 402-406. 1922.—A detailed description of the method by which tyramine, identified by physiological action and chemical tests, was obtained from seed of the plant in question.—W. W. Bonns.

4452. WALLIS, T. E. The Lycopodium method of quantitative microscopy. Jour. Roy. Microsc. Soc. London 1920: 169-178. 1920.—In determining the quantity of the elements in an admixture, as of starches, the nature of the substances is first ascertained and a mixture of equal parts of these prepared and a known amount of Lycopodium spores added. Microscopic counts of the three elements are made; then the same quantity of the unknown is mixed with the same amount of *Lycopodium* spores and counts made in the same way. From this the quantity of each of the elements in the unknown is calculated.—Wm. Randolph Taylor.

PHYSIOLOGY

B. M. DUGGAR, *Editor*W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 3671, 3766, 3794, 3800, 3815, 3825, 3935, 3943, 3967, 4116, 4118, 4122, 4149, 4205, 4239, 4240, 4260, 4288, 4321, 4451, 4612, 4613, 4618, 4619, 4622, 4624)

GENERAL

4453. HANDOVSKY, H. *Leitfaden der Kolloidchemie für Biologen und Mediziner*. [Guide to colloid chemistry for biologists and medical students.] 8 vo., xvi + 206 p., 1 pl., 33 fig. Theodor Steinkopff: Dresden and Leipzig, 1922.

4454. ONSLOW, M. W. *Practical plant biochemistry*. Roy. 8 vo, 2nd ed., vii + 194 p. University Press: Cambridge, 1923.

4455. OSTWALD, CARL WILHELM WOLFGANG. [Translated by MARTIN H. FISCHER]. *An introduction to theoretical and applied colloid chemistry* "The world of neglected dimensions." 2nd ed. (from 8th German ed.) xiii + 266 p., portrait, illus. John Wiley & Sons: New York, 1922.

PROTOPLASM, MOTILITY

4456. CHIBNALL, A. C. A new method for the separate extraction of vacuole and protoplasmic material from leaf cells. *Jour. Biol. Chem.* 55: 333-342. 1923.—The method consists in plasmolyzing the fresh leaves with ether or butyl alcohol, pressing out the major part of the vacuole content in a Buchner press, then washing out the remainder with 0.002 NHCl. Spinach leaves were used. The vacuolar fluid thus obtained contains only traces of protein, but does contain quantities of organic and inorganic phosphates. The cell walls are not ruptured by this treatment and the protoplasm, from which some of the water-soluble constituents may have been washed out, is retained in the cells and may be later obtained by grinding with water. It passes into colloidal solution and can be subsequently flocculated by the addition of acid. It is composed of substances soluble in alcohol and ether, together with a complex, the greater part of which is protein.—G. B. Rigg.

4457. WEBER, FRIEDL. *Reversible Viskositätserhöhung des lebenden Protoplasmas bei Narkose*. [Reversible increase in the viscosity of living protoplasm by narcotic action.] *Ber. Deutsch. Bot. Ges.* 40: 212-216. 1922.—Viscosity changes were measured by Weber's method, which makes use of the change in the position of the starch particles, that is, "Verlagerung" of the "statoliths" with centrifuging in conjunction with the particular treatment given. The author finds that the increase in viscosity with the epicotyls of *Phaseolus multiflorus* brought about by ether is considerable. The viscosity increase is reversible with weak ether concentrations, but higher strengths of the narcotic injures the protoplasm.—F. S. Howlett.

DIFFUSION, PHYSICO-CHEMICAL PHENOMENA, PERMEABILITY

4458. GIRARD, PIERRE. *Au sujet d'une note de M. L. Lapique sur le mécanisme des échanges entre la cellule et le milieu ambiant*. [Concerning a note by L. Lapique on the "mechanism for the interchange between the cell and the surrounding medium."] *Compt. Rend. Acad. Sci. Paris* 175: 64-65, 1922.—The experiments performed by Lapique [*Compt. Rend. Acad. Sci. Paris* 174: 1490] on living algae are reproducible *in vitro*. It is contended that it is impossible to evaluate the osmotic pressure of living cells.—C. H. Farr.

4459. GIRARD, PIERRE, W. MESTREZAT, et LI-SHOU-HOUA. *Schéme physique de la perméabilité sélective des cellules vivantes aux différents ions*. [A physical scheme of selective permeability of living cells to different ions.] *Compt. Rend. Acad. Sci. Paris* 175: 183-185. 1922.—Experiments are made on the selective permeability of anions and cations through

artificial membranes in an attempt to imitate the condition in living cells. It is recognized, however, that the condition in life is less simple than in these experiments, especially in that the intracellular solution is electrolytic and not pure water as in these experiments. BaCl_2 , BaI_2 , and MgCl_2 are used severally with HNO_3 ; and $\text{Ba}(\text{NO}_3)_2$ is used with trichloroacetic acid. Readings are given as to the number of ion-gm. per l. diffusing in 30-60 minutes.—*C. H. Farr.*

4460. LAPICQUE, LOUIS. *Mécanisme des échanges entre la cellule et le milieu ambiant.* [The mechanism of interchange between the cell and the surrounding media.] *Compt. Rend. Acad. Sci. Paris* 174: 1490-1492. 1922.—Studies are made on marine algae. In winter the bulb of *Saccorhiza bulbosa* has a salt content much higher than that of the sea water. With *Ectocarpus* it is found that a plasmolyzed cell in a hypertonic solution rapidly recovers its turgidity and finally acquires an osmotic pressure above that of the hypertonic medium. By dark field illumination it is found that the plasma membrane is not inert, but is constantly in a state of Brownian movement. The cell sap is acid and it is found that the protoplasm contracts in an alkaline and swells in an acid solution. Each particle of the protoplasm which is in motion acts as a sponge imbibing material from the external medium and giving it up to the internal. In this way salt is absorbed.—*C. H. Farr.*

4461. LESAGE, PIERRE. *Expériences pour servir à l'étude du mouvement des liquides dans les massifs cellulaires.* [Experiments of service in the study of the movement of liquids through cellular masses.] *Compt. Rend. Acad. Sci. Paris* 175: 47-50. 1922.—A difficulty is found in comparing the activity of the Dutrochet osmometer with the conduction of liquids from cell to cell. In the osmometer the lower liquid is separated from the solution by an artificial cell. In the experiments reported it is found that with ferrocyanide membranes the exosmosis is less and the evaporation more than with non-ferrocyanide membranes. It is suggested that a study of the structures involved in conduction from cell to cell, such as endodermis, secretory tissue, etc., would be of great importance.—*C. H. Farr.*

4462. MESTREZAT, W., PIERRE GIRARD and V. MORAX. *Perméabilité ionique élective des éléments cellulaires.* [Selective ionic permeability of cells.] *Compt. Rend. Acad. Sci. Paris* 174: 1727-1729. 1922.—It is found that the dissociated molecules do not traverse the membranes in the proportion of chemical equivalents, but that the ions each go in separately, for example the ratio of the absorption of nitrate (NO_3) ion to the calcium (Ca) ion may be $\frac{2}{1.02}$, $\frac{2}{1.32}$ or $\frac{2}{1.04}$. A table of data is given.—*C. H. Farr.*

4463. NEWTON, ROBERT, and ROSS AIKEN GORTNER. *A method for estimating hydrophilic colloid content of expressed plant tissue fluids.* *Bot. Gaz.* 74: 442-446. *Fig. 1.* 1922.—In a previous paper [*Bot. Gaz.* 74: 308-313. 1922] Gortner and Hoffman presented a refractometer method for determining the moisture content of plant saps. The data thus obtained have been applied in the present work. The procedure is as follows: "The freezing point depression of the freshly expressed plant juice is first obtained. Then, having determined the total solids by the refractometric method, a quantity of sucrose just sufficient to make a molar solution in the total water present is added. The freezing point depression is again determined and is usually found to have increased more than the theoretical amount." The method is based on the assumption "that the magnitude of the excess depression is a measure of the quantity of water held in such a way as to be unavailable for the solution of the sugar. The values obtained may be calculated to percentage "bound water." The authors hold that this "bound" water corresponds so regularly with the hydrophilic colloid content that the datum gained is indicative of the amount of such colloid present. Data from actual analyses illustrating the method are given together with formulae to be used.—*B. W. Wells.*

4464. PRAT, S. *Plasmolyse und Permeabilität.* [Plasmolysis and permeability.] *Biochem. Zeitschr.* 128: 557-567. 1922.—Three species of *Spirogyra* were studied for plasmol-

ysis effects. Univalent ions produced plasmolysis progressing in degree with time. In the case of bivalent ions the effect was either constant, or decreased with time. These results held for both anions and cations. In plasmolytic effectiveness the cations formed the following descending series: K, Na, Ca, Mg; and the anions the series NO_3 , Cl, SO_4 . An increase of permeability before death was not noted; on the contrary, a reduced permeability was often noted with monovalent ions. It was found that aniline increases the staining of the alga by methylene blue and neutral red.—*W. W. Bonns.*

4465. ROMIEU, MARC, et FERNAND OBATON. Étude spectroscopique du pigment vert du Chétopère et de la chlorophylle de l'Ulve. [A spectroscopic study of the green pigment of *Chaetophora* and of the chlorophyll of *Ulva*.] *Compt. Rend. Acad. Sci. Paris* 175: 51-54. 1 fig. 1922.—It is concluded that chetopterine is a pigment belonging to the group of the entero-chlorophylls, which it resembles spectroscopically very closely. It is believed to originate from the chlorophyll of the green algae and diatoms which are ingested into the digestive tube, and is not intrinsic with the animal.—*C. H. Farr.* ■

4466. STOKLASA, J. Ueber die Resorption des Aluminum-Ions durch das Wurzelsystem der Pflanzen. [The absorption of aluminum ions by the root systems of plants.] *Biochem. Zeitschr.* 128: 35-47. 1922.—Experiments with hydrophytes, mesophytes, and xerophytes in water cultures show on analysis that aluminum absorption decreases in these groups in the order named. In hydrophytes the ion is absorbed in relatively large amounts; the greatest quantities were found in roots and underground stems. Absorption was greater from dilute than from concentrated solutions. Within some concentration limits the roots of xerophytes appear impermeable to aluminum. Plasmolysis resulting from excess accumulation of aluminum ions occurs rapidly in xerophytes but more slowly in mesophytes and in hydrophytes only in the more concentrated solutions. The author concludes that aluminum absorption depends upon an exchange of cations. The aluminum ion absorption coincides with loss by the cells of other cations, such as Ca, Mg, or Na.—*W. W. Bonns.*

WATER RELATIONS

4467. BOBILIOFF, W. Over de functie van de melksapvaten van *Hevea brasiliensis* als waterreservoir. [The function of the latex vessels of *Hevea brasiliensis* as water reservoirs. *Arch. Rubbercult.* 5: 367-380. 1921.—Consideration is given to the theory that the latex vessels in *Hevea* serve as reservoirs for water storage. The author decides that this can not be the only function of latex. The changes in the water content of the latex are slight, the concentration remaining nearly constant even during periods of relatively dry weather.—*C. D. La Rue.*

4468. MOLISCH, HANS. Ueber den Einfluss der Transpiration auf das Verschwinden der Stärke in den Blättern. [The influence of transpiration on the disappearance of starch in leaves.] *Ber. Deutsch. Bot. Ges.* 39: 339-344. Fig. 1. 1921.—Excised leaves of *Tropaeolum majus* and other plants, previously exposed to strong sunlight, showed very little starch disappearance during the night period of 8-10 hours, provided the leaves were kept in a dark chamber saturated with moisture. Leaves kept in a dry chamber showed complete starch disappearance by morning. Analysis showed a lower percentage of reducing substances in the latter case. The author points out that the starch disappearance took place under conditions very favorable for rapid transpiration, which he considers very markedly slows down the changing of the starch to some form other than reducing sugars.—*F. S. Howlett.*

4469. PATTERSON, C. F. Growth in seedlings of *Phaseolus vulgaris* in relation to relative humidity and temperature. *Trans. Roy. Canadian Inst.* 14: 23-68. 1922.—The author concludes that the influence of relative humidity upon growth in higher plants has been greatly overestimated. Experiments with bean seedlings show that the available moisture in the substratum must be recognized as an important factor, as it may overcome in large measure the harmful effects of low relative humidity and of atmospheres possessing high evaporation coefficients.—*R. B. Thomson.*

MINERAL NUTRIENTS AND SALT RELATIONS

4470. BRIOUX, CH. Assimilabilité comparée du phosphate tricalcique et des phosphates d'alumine et de fer. [Comparative assimilability of tricalcic phosphate and the phosphates of aluminium and iron.] Compt. Rend. Acad. Sci. Paris 175: 1096-1099. 1922.—Tests were made with 6 types of cultivated plants, each with the 3 kinds of phosphate and a control with no phosphate. On the whole the best results were secured with aluminium phosphate, the tricalcium phosphate being next, and the control last.—C. H. Farr.

4471. COUPIN, HENRI. Sur l'origine de la carapace siliceuse des diatomées. [On the origin of the silicious shell of the diatoms.] Compt. Rend. Acad. Sci. Paris 175: 1226-1229. 1922.—The study was made by growing *Nitzschia linearis*, a fresh water species, on Knop's solution with non-nutrient gelatin. No growth was secured without silicon in the nutrient medium, nor was growth obtained with washed sand or colloidal silicon. The diatom grows well on kaolin, pulverized feldspar (orthose), or clay. Potassium and sodium silicate are poisonous. It is concluded that diatoms utilize aluminium silicate in the formation of the shells.—C. H. Farr.

4472. FISCHER, WILHELM. Zur Frage der Kalk Empfindlichkeit unserer Kulturpflanzen und ihrer Behebung durch Kali. [The question of sensitiveness to calcium of our cultivated plants and its neutralization by potassium.] Landw. Jahrb. 58: 1-53. 1923.—Ehrenberg observed a certain relationship between the calcium and potassium assimilation by plants. The calcium-potassium law shows the relationship between the assimilation of calcium and potassium by plants as indicated by ash analysis; when the calcium content rises, the potassium content is automatically depressed, with the same amount of potassium available to plants, resulting in injury to plant growth. Normal plant growth can again be obtained by an increase in potassium fertilization. The author found this law to apply to lupines and flax, but the results with beets could be applied for and against this law. Different plants possess different degrees of sensitiveness to calcium. This is related, in part, to the soil reaction and phosphorus availability. The author discusses further in detail the relation of calcium to the other common fertilizer constituents in the influence upon the growth of various plants.—S. A. Waksman.

4473. GARNER, W. W., J. E. McMURTREY, C. W. BACON, and E. G. MOSS. Sand drown, a chlorosis of tobacco due to magnesium deficiency, and the relation of sulphates and chlorides of potassium to the disease. Jour. Agric. Res. 23: 27-40. Pl. 1-7. 1923.—This chlorosis, prevalent on light sandy soils subject to leaching, resembles potash hunger in beginning at the tips of lower leaves, but the margin of the leaf is not puckered as in that disease. The yellow and green pigments are affected, so that the leaves become very pale yellow or almost white. When cured the formerly chlorotic leaf does not have the correct color; it is light in weight, thin, and inelastic.—The disease is due to magnesium deficiency, as shown by field and laboratory tests with pure chemicals. The ratio of magnesium to soluble sulphates seems to be of prime importance. The deficiency is readily made up by the use of sulphate of potash or of lime which contains some magnesium. One of the values of organic matter of vegetable origin as fertilizer is the continuous supply of magnesium which results from decomposition.—Biochemical studies of tobacco receiving different fertilizer treatments are reported. Potassium sulphate treatments greatly increased the amounts of potassium citrate and malate in the sap. Treatments with the chloride gave no such increases.—The function of Mg, Ca, and S, in a "complete" fertilizer clearly needs to receive consideration along with K, P, and N.—A method of conducting pot cultures in which soil is leached with complete and incomplete nutrient solutions is suggested for use in the study of problems in fertilizer action.—D. Reddick.

4474. LEROUX, L., et D. LEROUX. Contribution à l'étude de la répartition du fer dans les plantes. [The distribution of iron in plants.] Rev. Gén. Bot. 35: 24-33, 57-70. 1923.—Chemical determination of the distribution of iron, calcium, and magnesium in the various

parts of plants from a large number of families are reported. The authors conclude that (1) iron represents a slight proportion of the mineral material of plants; in 246 determinations it exceeded 2 per cent, while once it reached 2.97 per cent. (2) The proportion of iron in the ash was very variable, between 0.10 and 2.97, that is to say from 1 to 30 (which corresponds to a variation of 0.003–0.076 per cent or 1:25 based on dry weight). (3) Iron is unequally distributed in the different plant organs. In herbaceous plants the ash of the roots, and after the latter the ash of the flowers, was found to be particularly rich in iron. The leaves were the richest in calcium, and the organs of support (petioles, etc.) in magnesium. In woody plants the ash of the leaves regularly held the most iron. The ash of the organs of support was richest in calcium, and that of the fruits in magnesium. The great amount of iron in the ash from the branches of conifers is worthy of note.—*J. C. Gilman.*

4475. MAQUENNE, L., and R. CERIGHELLI. *Influence de la chaux sur le rendement des graines pendant la période germinative.* [Influence of calcium on the development of seeds during the period of germination.] *Compt. Rend. Acad. Sci. Paris* 174: 1269–1272. 1922.—The methods previously described by Maquenne and Demoussy were used. The results also agree with those of these authors, namely, that small quantities of calcium, 10 mg. CaSO_4 per l., have a favorable action upon the development of organs elaborated during germination, especially upon their increase in length.—*W. K. Farr.*

4476. MAQUENNE L., et E. DEMOUSSY. *Influence du calcium sur l'utilisation des réserves pendant la germination des grains.* [The influence of calcium on the utilization of food reserves during the germination of seed.] *Compt. Rend. Acad. Sci. Paris* 175: 249–252. 1922.—Two steps are distinguished in the germinative process: the analytic phase, in which the substances pass into the soluble form for translocation, and the synthetic phase, in which they pass back into an insoluble form,—such as cellulose, etc. Extracts of pea embryos were tested. A difference was found between those supplied with calcium and those without it. This difference is attributed to an effect of calcium on enzyme action. The dry weight was slightly greater in the control, and the extracts of cultures showed a slightly different refractive index than did the controls. Examination was also made of wheat, radish and nasturtium, and slight differences found. But it is concluded that calcium is nearly without influence on the transformation of the reserve food in the seed.—*C. H. Farr.*

4477. VERNET, G. *Rôle du chlorure de calcium dans la coagulation du latex d'Hevea brasiliensis.* [The rôle of calcium chloride in the coagulation of the latex of *Hevea brasiliensis*.] *Compt. Rend. Acad. Sci. Paris* 175: 719–721. 1922.—Calcium combines with the soluble phosphates of the latex rendering them less soluble; these remain incorporated in the rubber. The chloride coagulates the albuminoids.—*C. H. Farr.*

PHOTOSYNTHESIS

4478. BORESCH, KARL. *Photokatalysen in Pflanzen.* [Photocatalysis in plants.] *Naturwissenschaften* 10: 505–512. 1922.—This paper reviews the literature on the manifold photochemical effects on plants. The subjects taken up are: the rôle of mineral catalysts in the plant, the autosenesibilization of plant coloring substances, the photolysis of plant pigments, CO_2 assimilation, movements in response to light stimuli as effected by photocatalysis, deleterious light effects, the proportionality laws between the light effect and light absorption, photodynamic effects, and reducing substances. A useful bibliography concludes the article.—*Orton L. Clark.*

4479. KOSTYTSCHEW, S. *Studien über Photosynthese. 1. Das Verhältnis CO_2/O_2 bei der Kohlensäureassimilation.* [Photosynthesis. 1. The ratio CO_2/O_2 in carbon dioxide assimilation.] *Ber. Deutsch. Bot. Ges.* 39: 319–328. 1921.—Leaves exposed to sunlight in CO_2 air showed a high CO_2/O_2 ratio. Continued exposure lowered the ratio to nearly 1, this being especially true for the species of algae worked with. Apparently some of the CO_2 is chemically combined or is in solution with colloidal chlorophyll, since the evidence shows that

practically no CO_2 is held in the intercellular spaces. Respiration and CO_2 assimilation in darkness could not be correlated during the short time of this experiment. It is concluded that the CO_2/O_2 ratio will become practically 1 for any plant after a sufficiently long exposure.—*M. H. Cubbon.*

4480. KOSTYTSCHEW, S. Studien über Photosynthese. 2. Wirkt Wundreiz stimulierend auf die Kohlensäureassimilation am Lichte? [Photosynthesis. 2. Does wounding have a stimulating effect on CO_2 assimilation in light?] Ber. Deutsch. Bot. Ges. 39: 328-333. 1921.—The results secured showed consistently that wounding slightly decreased the assimilation of CO_2 . The author concludes that the cell plasma has nothing to do with CO_2 assimilation but that the chloroplasts function instead. The method used is recommended by the author as one suitable for conducting experiments with leaves when the time of exposure is quite long.—*M. H. Cubbon.*

4481. KOSTYTSCHEW, S. Studien über Photosynthese. 3. Findet eine Kohlensäureassimilation während der Sommernächte in der subarktischen Region statt? [Photosynthesis. 3. Does CO_2 assimilation occur during the summer night in subarctic regions?] Ber. Deutsch. Bot. Ges. 39: 334-338. 1921.— CO_2 assimilation remained fairly rapid up to the time the sun set, but no amount of exposure to the strongly diffused light during the night produced noticeable assimilation. The sudden drop was due to a fall in temperature as well as to inability of stomata to open wider. Conifers gave a rather rapid rate of assimilation after sundown. A very small amount of CO_2 was given off during the exposure to strongly diffused light.—*M. H. Cubbon.*

4482. KOSTYTSCHEW, S. Studien über Photosynthese. 4. Die CO_2 Assimilation der Leguminosen. [Photosynthesis. IV. CO_2 -assimilation by legumes.] Ber. Deutsch. Bot. Ges. 40: 112-119. 1922.—The main results are as follows: (1) CO_2 assimilation, under conditions of increased CO_2 content, is decidedly higher in legumes than in non-leguminous plants; (2) plants growing in soils rich in nitrates assimilate CO_2 much more rapidly than plants of the same species growing in a nitrate-free soil; (3) in experiments of short duration, nitrates do not increase the number of cc. of CO_2 used per square dm. leaf area per hour; (4) in spite of the presence of root tubercles, species of *Alnus* show the same assimilation rate as plants unable to fix free nitrogen.—*W. C. Muenischer.*

4483. WEINBERG, A. VON. Photosynthese (Willstätters neue Assimilationstheorie). [Photosynthesis (Willstätter's new theory of assimilation).] Ber. Senckenberg. Naturf. Ges. Frankfurt am Main 50: 172. 1920.—A report is given of a lecture on Willstätter's theory of assimilation. The respective parts played by chlorophyll, sunlight, and an enzyme are described, and the conclusion is reached that protoplasm or the enzyme is essential to photosynthesis. Isolated chlorophyll acted upon by light can carry on only the first step in the process.—*A. W. Evans.*

METABOLISM (GENERAL)

4484. ADLER, O. Ueber eine Holzreaction nebst Bemerkungen über das Anethol. [A reaction of wood, with observations on anethol.] Biochem. Zeitschr. 128: 32-34. 1922.—This is a consideration of the green color produced by immersing wood in a concentrated acetic acid solution of phenylhydrazine hydrochloride and an effort to determine the nature of the reaction by similar color production with known reagents. The conclusion is reached that the wood reaction is due to a derivative of anethol.—*W. W. Bonns.*

4485. BAILEY, E. M., HELEN C. CANNON, and H. J. FISHER. The potency of some commercial vitamine preparations as compared with that of dry brewers' yeast. Connecticut Agric. Exp. Sta. Bull. 240. 3-51. 1922.—Twenty-two products were partially analyzed chemically and fed to rats; brewers' yeast was used as the control product. In some instances the analyses suggest an explanation of observed impotency of the product in that it has been

diluted or changed by adding various medicaments of established reputation in therapeutics. The feeding test results with rats are given by means of graphs explained by accompanying notes. Yeast Vitamine-Harris tablets, Yeast Vitamine-Harris powder, and Vegex brought the rats to normal weight. The following gave results closely approximating the controls: Cerevisine, Yeast Foam Tablets, Merck's Medicinal Yeast (tablets and powder), and Metagen. Maintenance, or indifferent or inconsistent growth was obtained with Vita Zest, Fleischmann's Yeast, Yeastmine, Vitamon, and Ironized Yeast. The following failed conspicuously in all trials: Magic Yeast, Medic Yeast, Phos-pho Vitamine, Phytamin, Vi-ta-co, Yeastone, and Yeastonic. Yeast Vitamine-Harris powder and tablets, Vegex, and Yeast Foam Tablets were effective in half doses, while Vegex failed in quarter doses. Lower doses than 25 mgm. were not used.—*Henry Dorsey.*

4486. BERGMANN, MAX. Über die Bildung der Glucoside. [On the formation of glucosides.] *Naturwissenschaften* 10: 838-842. 1922.

4487. BOAS, F. Untersuchungen über die Mitwirkung der Lipoide beim Stoffaustausch der pflanzlichen Zelle. II Mitteilung. [Studies on the rôle of lipoids in plant cell metabolism, II Contribution.] *Biochem. Zeitschr.* 129: 144-152. 1922.—The permeability of sapotoxin, choleate, glycocholeate, choline and tannocholate of sodium, urethan and quinine hydrochloride was studied with and without NaCl present. Yeast cells were used as permeability indices. Injurious effects of the several reagents are accounted for on the basis of change in the colloidal structure of the cell lipoids, by which permeability is increased to an injurious degree.—*W. W. Bonns.*

4488. BORESCH, K. Ueber die Pigmente der Alge *Palmellococcus miniatus* Chod. var. *Porphyrea Wille n. v.* [Pigments of the alga *Palmellococcus miniatus* Chod. var. *porphyrea Wille n. v.*] *Ber. Deutsch. Bot. Ges.* 40: 288-291. 1922.—This reddish brown alga was grown on agar in the absence of other algae. Water extracts of the cell pigment were examined spectroscopically and found to compare very closely with the pigments of many phycoerythrin containing Schizophyceae. This is apparently the first time that "schizophyceae-phycoerythrin" has been described in a member of the Protococcales or outside of the Schizophyceae.—*W. C. Muenscher.*

4489. BRAECKE, MARIE. Sur la présence d'aucubine et de mélampyre dans plusieurs espèces de mélampyres. [On the presence of aucubine and of melampyre in many species of *Melampyrum*.] *Compt. Rend. Acad. Sci. Paris* 175: 990-992. 1922.—*Melampyrum pratense*, *M. nemorosum*, and *M. cristatum* were studied in particular. Aucubine was found in all and melampyre in the last 2.—*C. H. Farr.*

4490. BRIDEL, MARC, et MARIE BRAECKE. Sur la présence d'aucubine et de saccharose dans les graines de *Rhinanthus Crista-Galli* L. [On the presence of aucubine and saccharose in the seed of *Rhinanthus Crista-Galli*.] *Compt. Rend. Acad. Sci. Paris* 175: 532-534. 1922.—In addition to the polariscopic tests, a study was made of the action of emulsin and invertin. Both aucubine and saccharose were found in the pure state.—*C. H. Farr.*

4491. CANNON, PAUL R., and B. W. MCNEASE. Factors controlling intestinal bacteria. The influence of hydrogen-ion concentration on bacterial types. *Jour. Infect. Diseases* 32: 175-180. 1923.—The higher acidity of the contents of the intestine resulting from carbohydrate as contrasted with protein feeding was correlated with a simplification of the intestinal flora, *B. acidophilus* predominating under the more acid conditions.—*R. L. Starkey.*

4492. COLIN, H., et H. BELVAL. La genèse des hydrates de carbone dans le blé. Présence de lévulosanes dans la tige. [The origin of carbohydrates in wheat. The presence of the levulosanes in the stem.] *Compt. Rend. Acad. Sci. Paris* 175: 1441-1443. 1922.—In the leaves of wheat the only soluble carbohydrates present are saccharose and the products of

its hydrolysis. An analysis is made of the leaves and stems of wheat on 5 dates from May 18 to July 1, material being collected at 4 o'clock in the afternoon. Records were obtained for the total sugar content, the reducing sugars, saccharose, the levulosanes, and the dextrose-levulose ratio. It is found that the levulosanes do not appear until the latter part of this period. The reducing sugars reach a maximum in the stem near the middle of the period and saccharose shows a gradual increase to the end.—*C. H. Farr.*

4493. COMBES, RAOUL, et DENISE KOHLER. *Ce que deviennent les hydrates de carbone quand meurent les feuilles des arbres.* [The destination of the carbohydrates when the leaves of trees die.] *Compt. Rend. Acad. Sci. Paris* 175: 590-592. 1922.—This is a continuation of the study previously reported [*Compt. Rend. Acad. Sci. Paris* 175: 406], using *Fagus silvatica* and *Aesculus Hippocastanum*. Analyses were made of the leaves at the beginning of the yellowing period and after the leaves had turned brown. Between these dates some of the leaves used remained on the tree, and others were picked and kept under similar conditions. It was found that the soluble carbohydrates decrease during yellowing to a greater extent in the attached leaves. It is also found that in such leaves the hydrolyzable, insoluble carbohydrates increase during yellowing to a greater extent. About 45 per cent of the carbohydrate remains in the leaf during yellowing; about 35 per cent is lost in respiration and washing by rain; and about 20 per cent passes back into the stem. It is not believed that the soluble carbohydrates contribute at this time to the hydrolyzable, insoluble carbohydrates.—*C. H. Farr.*

4494. FULTON, JOHN F., JR. *Animal chlorophyll: its relation to haemoglobin and to other animal pigments.* *Quart. Jour. Microsc. Sci.* 66: 339-385. 1922.—The present paper aims to show that the pigment responsible for color in certain representative invertebrates comes from the blood stream, and that in many cases the pigment cells of the blood arise (while in circulation) from unpigmented corpuscles. The animal kingdom is discussed as 2 groups, those without a blood-vascular system and those with such a system. Through the animal kingdom the strong relationship between the body pigments and chlorophyll is shown and the author concludes that there is strong evidence that the respiratory pigment haemoglobin is derived both phylogenetically and physiologically from chlorophyll. An extensive bibliography is appended.—*C. S. Hoar.*

4495. GORTER, K. *Sur la constitution de la lycorine.* [The constitution of lycorine.] *Bull. Jard. Bot. Buitenzorg* III, 2: 1-7. 1920.—A structural formula is assigned to this body, previously described and the properties of several derivatives are defined.—*C. C. Epling.*

4496. GORTER, K. *Sur la distribution de la lycorine dans la famille des Amaryllidacées.* [The distribution of lycorine in the Amaryllidaceae.] *Bull. Jard. Bot. Buitenzorg* III, 1: 352-358; 2: 331-334. 1919-20.—Lycorine, first isolated from *Lycoris radiata* Herb., has since been reported from 13 genera of the family. Negative results are reported in the case of *Pancratium*, *Hippeastrum*, and *Polianthes*.—*C. C. Epling.*

4497. GORTER, K. *Sur l'hyptolide, principe amer d'Hyptis pectinata* Poit. [Hyptolide, the bitter principle of *Hyptis pectinata*.] *Bull. Jard. Bot. Buitenzorg* III, 1: 327-337. 1919.—A lactone obtained from *Hyptis pectinata* Poit. is described and a formula is assigned.—*C. C. Epling.*

4498. GREINER, I. *Ueber die Bestimmung kleiner Zuckermengen nach den Bertrand-schen Verfahren.* [The determination of small amounts of sugar by the Bertrand method.] *Biochem. Zeitschr.* 128: 274-278. 1 fig. 1922.—There is given an outline of the method of procedure, with a table of copper equivalents of sugar.—*W. W. Bonns.*

4499. HELLER, V. G. *Studies on yeast. V. The vitamin B content of yeast.* *Jour. Biol. Chem.* 55: 385-398. 1923.—The vitamin B potency of yeast (*Saccharomyces cerevisiae*

[Race F]) for rats has been determined. Drying the yeast destroys some of its vitamin. This yeast when grown on a synthetic medium is not as rich in vitamin B as when grown on wort. This yeast synthesizes not only the growth-promoting vitamin, but the antineuritic vitamin as well.—G. B. Rigg.

4500. JONESCO, ST. Les pigments anthocyaniques et les phlobatannins chez les végétaux. [The anthocyanic pigments and the phlobatannins of plants.] Compt. Rend. Acad. Sci. Paris 175: 904-907. 1922.—A study is made of the pigments of the red leaves of *Prunus pissardi*. It is concluded that the phlobatannins are not the same as the pseudo-bases of Kurt Noach. The so-called anthocyanins are regarded as of 3 different kinds: (1) the anthocyanins of Willstätter, which are red, blue, or violet, and which do not fade with amyl alcohol; (2) the anthocyanidines, red in color, existing in a free state in the tissues, and fading readily with amyl alcohol; (3) the leuco-anthocyanidines or pseudo-bases, which are yellow, fading with amyl alcohol, and passing over into anthocyanidines upon heating with hydrochloric acid.—C. H. Farr.

4501. JONESCO, ST. Sur la répartition des anthocyanidines dans les organes colorés des plants. [The distribution of the anthocyanidines in the pigmented parts of plants.] Compt. Rend. Acad. Sci. Paris 174: 1635-1637. 1922.—Rosenheim reported anthocyanidines in the free state in leaves of *Vitis vinifera* in 1920, and independently Jonesco discovered them in fruits, leaves, and flowers of other plants. Since then, attempts have been made to find them in plant organs colored red, violet, or blue. Red leaves of *Ampelopsis*, reddish violet leaves of beet, red stems of *Sarrasin argente*, violet flowers of gladioli and *Cobaea scandens*, reddish purple flowers of *Canna* and rose and blue flowers of *Centaurea cyanus* were studied. Anthocyanidines were found in *Ampelopsis* and *Sarrasin*, but in the other 6 forms a yellowish pigment was present in addition to anthocyan. It is concluded that anthocyanidines do not always accompany anthocyanins, but are especially characteristic of red organs.—C. H. Farr.

4502. KOLKWITZ, R. Ueber das Schicksal des Chlorophylls bei der herbstlichen Laubverfärbung. [The fate of chlorophyll in autumnal leaf coloration.] Ber. Deutsch. Bot. Ges. 37: 2-5. 1919.—It has been held by some that autumnal leaf coloration is due to the withdrawal of certain components of chlorophyll from the leaf to the perennial plant parts in order to economize compounds of M, P, and C. The author reports observations and experiments which are interpreted as indicating that this is not the case. He calculates, from data of Willstätter and Stoll, that the N content of chlorophyll *a* and *b* is only about 0.05 per cent of the dry matter of leaves.—W. C. Muenscher.

4503. KOSTYTSCHEW, S. Ueber die Ernährung der grünen Halbsschmarotzer. [Nutrition of green semi-parasites.] Ber. Deutsch. Bot. Ges. 40: 273-279. 1922.—The author discusses previous work done on the nutrition of green semi-parasites. The following species used in the experiments reported in this paper: *Electrolophus major*, *Melampyrum pratense*, *Pedicularis* spp., *Euphrasia* spp., and *Odontites rubra*, all belonging to the Rhinanthaceae under Schophulariaceae. Experiments show that, in general, there is no difference in the CO₂ assimilation rate between turgid cuttings of these species and autotrophic species of the same family. The transpiration rate in these semi-parasites is markedly increased when the roots are removed under water. The author believes that the initial cause for the beginning of parasitism in semi-parasites is the inability of the roots to supply water lost by transpiration so that the plants obtain water through root haustoria from the host, which necessitates the transfer of organic materials into the roots of the semi-parasite. Later this condition may influence the development of the leaf structure and chlorophyll apparatus to such an extent that parasitism may result. The Rhinanthaceae have only taken the first step toward a parasitic mode of living; they show a reduction of the root system but not of the chlorophyll apparatus.—W. C. Muenscher.

4504. KRITCHEVSKY, I. L., and A. L. DOUCHOWSKY. Structure of complement. Jour. Infect. Diseases 32: 187-191. 1923.—The sap of *Cotyledon Scheideckeri* inactivated complement. Absorption of the complement by the precipitate and not decomposition seemed to occur.—R. L. Starkey.

4505. METZNER, P. Ueber den Farbstoff der grünen Bacterien. [Pigments of green bacteria.] Ber. Deutsch. Bot. Ges. 40: 125-129. Fig. 1. 1922.—The author discusses the literature dealing with the pigments found in such green bacteria as *Bacterium viride*, *B. chlorinum*, *Bacillus virens*, and *Streptococcus varians*. In some preliminary experiments the author examined spectroscopically alcoholic extracts of the green pigments obtained from dried masses of green bacteria free from algae. It is concluded that this green pigment which he tentatively calls "bacterioviridin" is not identical with the chlorophyll of the higher plants.—W. C. Muenscher.

4506. MIRANDE, MARCEL. Sur la relation existant entre l'acidité relative des tissus et la présence de l'anthocyanine dans les écailles de bulbes de lis exposées à la lumière. [The relation existing between the relative acidity of the tissues and the presence of anthocyanin in the scales of the lily bulb exposed to light.] Compt. Rend. Acad. Sci. Paris 175: 711-713. 1922.—Leaves detached and exposed to light show an increase in acidity due to wounding and an increase also correlated with pigmentation. In darkness only the first increment is obtained. Acidity of leaves attached, 1.134 cc.; detached, in light, 1.876 cc.; detached, in dark, 1.622 cc. Readings are in cc. of a solution of phenolphthalein and KOH per gm. of fresh weight. It is thus concluded that oxidation occurs in anthocyan synthesis.—C. H. Farr.

4507. ROBERTSON, R. C., and D. J. DAVIS. Food accessory factors (vitamins) in bacterial growth. Observations on the ultimate source of accessory growth substances for yeast VII. Jour. Infect. Diseases 32: 153-158. 1923.—It was observed that while yeast was incapable of giving continued growth upon a synthetic medium, the addition of extracts of beef heart, carrot, potato, and yeast produced a luxuriant and continuous growth. The optimum concentration of the extracts was found to be about 1: 500. The further point was made that these extracts alone will not permit continuous growth, and that the ultimate origin of the seemingly necessary growth stimulating substances is still unknown. The quality of continuity of growth was tested by transplants upon dextrose agar at intervals of 24 hours.—R. V. Allison.

4508. TERROINE, ÉMILE-F., R. WURMSER, et J. MONTANÉ. Influence de la constitution des milieux nutritifs sur la composition de l'*Aspergillus niger*. [The influence of the constitution of the nutritive media on the composition of *Aspergillus niger*.] Compt. Rend. Acad. Sci. Paris 175: 541-544. 1922.—This is a continuation of earlier work [Compt. Rend. Acad. Sci. Paris 175: 228]. A study is made of the effect of stage of development, concentration of $(\text{NH}_4)_2\text{SO}_4$, concentration of carbohydrate, kind of nitrogenous compounds used, kind of carbohydrate, and the influence of starvation. It is found that reserve nitrogen is absent in the presence of high concentrations of ammonium compounds, that ternary substances accumulate in the presence of high concentrations of carbohydrates, and that proteins are consumed in starvation. All data show the correspondence between the physiology of *Aspergillus* and that of the higher animals.—C. H. Farr.

4509. WEBER, U. Beitrag zur Kenntnis der esterbildenden Hefen. [The ester forming yeasts.] Biochem. Zeitschr. 129: 208-218. 1922.—Four yeasts and 2 imperfect fungi were studied for growth, fermentation power, and ester formation, determining the latter by the strength of the resulting odor. Considerable variation in reactions was noted. In some cases, as in an atmosphere of CO_2 , vigorous growth was accompanied by no detectable ester formation. Ester formation occurred where carbohydrate fermentation supplied the energy for proteolysis, or when some energy substitute for the carbohydrates was present. The addition of alcohol effected a change in the nature of the ester odor. Nitrogenous nutrients resulted in ester odor changes only with a corresponding change in the amino acids present. When leucine was added to the substrate the odor of amyl ester resulted.—W. W. Bonns.

4510. WILLE, N. *Phycoerythrin bei den Myxophyceen.* [Phycoerythrin in Myxophyceae.] Ber. Deutsch. Bot. Ges. 40: 188-192. Fig. 1. 1922.—The author reviews the work, especially that of Boresch, dealing with the occurrence of phycoerythrin in the Myxophyceae. The author calls attention to an unpublished note written by him in 1889, reporting phycoerythrin in *Phormidium persicinum* (Rke.) Gom. The absorption spectra of the phycoerythrin of this *Phormidium* were identical with those produced by *Rhodomenia palmata* (L.) Grev. The author considers this, along with other conditions, as evidence of the origin of Florideae from the Myxophyceae.—W. C. Muenscher.

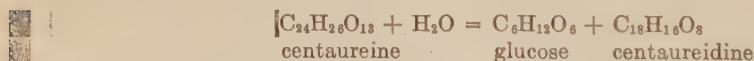
4511. ZIEGENSPECK, H. *Amyloid in jugendlichen Pflanzenorganen als vermutliches Zwischenprodukt bei der Bildung von Wandkohlenhydraten.* [Amyloid as an intermediate product in the building of wall carbohydrates in young plant organs.] Ber. Deutsch. Bot. Ges. 37: 273-278. 1919.—The presence of amyloid was demonstrated in young parts of a number of plants. The author points out reasons why it is difficult to find this product in many plants.—W. C. Muenscher.

METABOLISM (NITROGEN RELATIONS)

4512. BERG, R. *Die Vitamine: kritische Übersicht der Lehre von den Ergänzungsstoffen.* [The vitamins: critical survey of the accessory growth-promoting substances.] 386 p. S. Hirzel; Leipzig, 1922.

4513. BLANCK, E., W. GEILMANN, and F. GIESECKE. *Die Stickstoffwirkung des Hexamethylentetramins auf die Pflanzenproduction.* [The effect of nitrogen in the form of hexamethylentetramine upon plant production.] Jour. Landw. 70: 221-251. 1922.—By means of sand and loam pot experiments the effect of hexamethylenetetramine upon plant growth was ascertained. This complex compound is as favorable a source of nitrogen as is $(\text{NH}_4)_2\text{SO}_4$ as measured by the growth of oats, mustard, and beets. Bacterial activity transforms the organic compound into NH_3 and then into nitrate, a suitable material for the growth of plants. Hexamethylenetetramine is formed by the condensation of NH_3 and HCHO , as well as by the treatment of urea and liquid manure, both of which contain NH_3 , with formalin.—F. M. Schertz.

4514. BRIDEL, M., et C. CHARAUX. *La centaureidine, produit de dédoublement de la centaureine glucoside des racines de Centaurea Jacea L.* [Centaureidine, produced by the splitting of the glucoside centaureine of the roots of *Centaurea Jacea*.] Compt. Rend. Acad. Sci. Paris 175: 1168-1170. 1922.—In a former paper [see following entry] the method of purification and crystallization of the compounds is presented. This paper gives the determination of its exact chemical composition. The reaction is found to be:



The relative amounts of the products are 34.48 per cent glucose and 68.96 per cent centaureidine. The latter is yellow in color but differs from the flavones in composition, as they are $\text{C}_{15}\text{H}_{10}\text{O}_2$.—C. H. Farr.

4515. BRIDEL, MARC, et CAMILLE CHAURAUX. *La centaureine, glucoside nouveau, retiré des racines de Centaurea Jacea L.* [The centaureine, a new glucoside, secured from the roots of *Centaurea Jacea*.] Compt. Rend. Acad. Sci. Paris 175: 833-835. 1922.—The physical and chemical properties of this compound are here given. It contains no N but consists of 50 per cent C and 5 per cent H, and breaks up into CO_2 and H_2O . It hydrolyses into 33.68 per cent glucose and 70.77 per cent centaureidine. It may be obtained in the pure crystalline form.—C. H. Farr.

4516. COHN, E. J. A physicochemical method of characterizing proteins. IV. Jour. Biol. Chem. 55: Proc. XLIV-XLV. 1923.

4517. DAVIDSON, JEHIEL. Reduction of nitrates caused by seed as a possible factor in the economy of nitrogen in crop production. Jour. Amer. Soc. Agron. 14: 338-354. 1922.—Under laboratory conditions, reduction of nitrates is induced by seed. The quantity of seed, the basic radicles of the common nitrates, the concentration of the nitrate solution, and the depth of the liquid in which the seed are submerged did not essentially affect the course of the process within the limits of experimentation by the author. At 50°F. the reduction process was somewhat retarded, otherwise it followed its normal course. Growing seedlings produced a smaller quantity of nitrites than seed which had been rendered incapable of germination by heating or those naturally sterile. Young seedlings induced reduction of nitrates when grown in soil. Actual loss of nitrogen was demonstrated as a result of reduction of nitrates caused by seed.—F. M. Schertz.

4518. FISCHER, EMIL. Untersuchungen über Aminosäuren, Polypeptide und Proteine II (1907-1919). Collected works, edited by M. BERGMANN. Sup. Roy. 8 vo, ix + 922 p. J. Springer: Berlin, 1923.

4519. PRIANISCHNIKOW, D. Ueber den Aufbau und Abbau des Asparagins in den Pflanzen. [Synthesis and decompositions of asparagin in plants.] Ber. Deutsch. Bot. Ges. 40: 242-248. 1922.—The author presents data on asparagin synthesis obtained from experiments with *Lupinus luteus* grown under various conditions of light and carbohydrate supply. The results indicate that the food supply and not the species of the seedlings determines whether an amid (asparagin or glutamin) is synthesized; only when carbohydrates or fats are present, is asparagin synthesized. Otherwise, neither the ammonia supplied externally nor that resulting from respiration can be synthesized into asparagin. It is pointed out that proteins and amino acids of the general formula $R(NH_2)COOH$, by oxidation and secondary synthesis, are changed to acid amids of the general formula $R(NH_2)CONH_2$ (asparagin and glutamin) and, during starvation, by further oxidation, to ammonia. In the presence of carbohydrates the process is reversed, ammonia is changed to acid amids, which in the presence of additional carbohydrates are built up into amino acids and used in protein synthesis. Ammonia is the first and last step in the change of nitrogenous compounds in plants. Asparagin (or glutamin) is a necessary intermediate product in the synthesis and decomposition of proteins.—W. C. Muenscher.

4520. TERROINE, ÉMILE F., et RENÉ WURMSER. L'utilisation des substances ternaires dans la croissance de l'*Aspergillus niger*. [The utilization of ternary substances in the growth of *Aspergillus niger*.] Compt. Rend. Acad. Sci. Paris 175: 228-230. 1922.—This is a continuation of work previously reported [Compt. Rend. Acad. Sci. Paris 174: 1435]. The utilization ratio described therein has been determined for 6 different sugars, the source of nitrogen being 0.5 per cent $(NH_4)_2SO_4$; also the utilization ratio with various concentrations of $(NH_4)_2SO_4$, the sugar being constant—3 per cent glucose; also the utilization ratio with 7 different sources of nitrogen. The ratios for the sugars vary from 46 for levulose to 41 for sucrose, arabinose, and xylose. Among the nitrogen sources HNO_3 gives the highest ratio, 46. Twenty per cent $(NH_4)_2SO_4$ is found to be the best (45) concentration, and 40 per cent the lowest (41). A study is also made of the effect of the acidity of the media in the range pH 1.3-7. It is found that 1.3 is optimum (43) and 5 is minimum (32).—C. H. Farr.

4521. WATERMAN, H. C., C. O. JOHNS and D. B. JONES. Conphaseolin. A new globulin from the navy bean, *Phaseolus vulgaris*. Jour. Biol. Chem. 55: 93-104. 1923.—A hitherto unknown globulin, differing most conspicuously from phaseolin and phasein in its much higher sulphur content, has been isolated from the navy bean and named conphaseolin. It contains 10.69 per cent of lysine, the highest per cent of this amino acid that has thus far been found for any vegetable protein.—G. B. Rigg.

4522. WINOGRADSKY, S. Sur la prétendue transformation du ferment nitrique en espèce saprophyte. [On the supposed transformation of a nitric ferment to a saprophytic species.] Compt. Rend. Acad. Sci. Paris 175: 301-304. 1922.—This is a discussion of the work of the

author's students and of others, especially that of Beijerinck on *Nitrobacter oligotrophum*. Beijerinck maintains that growth and nitrification are separate functions, while the author claims that they are inseparable. Chemosynthesis is likely, though not entirely proven for this form.—C. H. Farr.

METABOLISM (ENZYMES, FERMENTATION)

4523. ATKINS, W. R. G. The hydrogen ion concentration of the cells of some marine algae. Jour. Marine Biol. Assoc. United Kingdom [Plymouth] 12: 785-788. 1922.—The measurements recorded for marine algae of various groups show a sap reaction which in most cases is almost neutral, and in no case of the pronounced acid character met with in many land plants. It follows on evidence previously presented that the enzymes concerned in the metabolism of these algae must differ from those which effect corresponding changes in land plants.—Marshall A. Howe.

4524. BAYLISS, W. M. Enzyme als Kolloide. [Enzymes as colloids.] Naturwissenschaften 10: 983-988. 1922.—This is a general discussion of aspects of enzyme behavior.—C. C. Epling.

4525. CHODAT, R., et E. ROUGE. Sur la localisation intracellulaire d'une oxydase, et la localisation en général. [The intracellular and general localization of an oxydase.] Compt. Rend. Acad. Sci. Paris 175: 252-255. 1922.—A statement of the difficulties and problems involved in localizing enzymes in cells is given. A method is described for making such tests using potato as an example. Similar results are reported for *Leucanthemum vulgare*, *Helianthus tuberosus*, and *Stachys tuberosa*.—C. H. Farr.

4526. EHRENBERG, R. Ueber Eiweissenzyme. [On protein enzymes.] Biochem. Zeitschr. 128: 431-449. 1922.—Dialyzing trypsin and pepsin solutions and preparations of animal tissues, the author found the dialysates to possess enzyme activity.—W. W. Bonns.

4527. FUNK, E. Ueber den Einfluss von Kobaltammoniakaten auf die Fermentwirkung der Katalase und Amylase. [The effect of cobalt ammoniates on the enzyme action of catalase and amylase.] Biochem. Zeitschr. 128: 108-118. 1922.—Amylase and catalase were treated with solutions of hexamminocobaltichloride, xanthocobalt chloride, trinitrotri-aminocobaltiate, potassium tetranitrodiamminocobaltiate, and cobalt sodium nitrite. Catalase activity was inhibited and amylase activity accelerated. Inhibition was proportionate to salt concentration even in very dilute solution, but acceleration (for amylase) with increase of concentration was slight. The minimum concentrations effecting increased activity were greater than minimums inhibiting catalase. With the exception of one salt, inhibition was increased by adding phosphates to neutrality.—W. W. Bonns.

4528. FURTH, O., und F. LIEBEN. Ueber Milchsäurezerstörung durch Hefe und durch Blutzellen. [The destruction of lactic acid by yeast and by blood cells.] Biochem. Zeitschr. 128: 144-168. 1 fig. 1922.—Yeast as well as blood cells are capable, under favorable conditions, of destroying lactic acid in considerable quantities by oxidation. For yeast such destructive power does not appear to have marked relation to the optical properties of the acid, to temperature, oxygen pressure, or the pressure of a "hydrogen acceptor," but close contact of yeast with oxygen seems a necessary condition. Lactic acid destruction is associated with CO₂ evolution in considerable amounts, of which only a part could be ascribed to loss in sugar. In no case was the greater mass of lactic acid split into CO₂ and H₂O, but was reconverted to sugar. The destructive action of yeast was markedly reduced by acetone or by raising to the boiling point.—W. W. Bonns.

4529. GORIS, A., et P. COSTY. Sur l'uréase et l'urée chez les champignons. [On urease and urea in the fungi.] Compt. Rend. Acad. Sci. Paris 175: 998-999. 1922.—Twelve species of Hymenomycetes are compared as to the urease in different parts,—stipe, cap, and hy-

menium. It is present in all parts, being most abundant in the hymenium. Several genera are arranged in descending order of the amount of urease, as follows: *Boletus*, *Clitocybe*, *Trametes*, *Entyloma*, *Russula*, *Lactarius*, *Tricholoma*, *Polyporus*, *Cortinarius*, *Collybia*, *Hydnum*, and *Thelephora*.—C. H. Farr.

4530. GORIS, A., et P. COSTY. *Uréase et urée chez les champignons*. [Urease and urea in the fungi.] *Compt. Rend. Acad. Sci. Paris* 175: 539-541. 1922.—Goris and Mascre (1908) first reported urea in the higher fungi. Since then they have repeated and extended their observations, employing new methods. It is now concluded that nearly all of the Basidiomycetes and Ascomycetes possess urease. Two hundred species have been tested. A list is given of certain higher fungi with the amount of urea found in each. Many of the species in this list do not contain urease. The amount of urea varies from 0.28 to 9.23 per 1000.—C. H. Farr.

4531. HAYDUCK, F., und H. HAEHN. *Das Problem der Zymasebildung in der Hefe*. [The problem of zymase formation in yeast.] *Biochem. Zeitschr.* 128: 568-605. 1922.—This is a report with detailed experiments. The paper considers the following: (1) the conception of fermentive power in a yeast; (2) formation of zymase in *Torula* yeasts; (3) zymase formation and nuclein metabolism. The experiments indicate that a yeast of low activity can by proper subjection to free oxygen be developed into one of high growth activity. The question whether enzyme synthesis has been effected or whether only a zymogen activation has been increased, is left open. Marked nuclein metabolism is noted in conjunction with the zymase formation.—W. W. Bonns.

4532. HIRSCH-POGANY, M. *Liegt der Hitze-Koagulation des Eiweisses eine Hydrolyse zugrunde?* [Is heat coagulation of proteins a hydrolysis?] *Biochem. Zeitschr.* 128: 396-401. 1922.—Analyses of the dried coagulum obtained after heating egg albumen solutions and of the dried substance in the filtrate, as well as analyses of such solutions evaporated at room temperatures, indicate that any hydrolysis that may occur is too small to be determined by such methods.—W. W. Bonns.

4533. HOLWERDA, B. J. *Ueber den Einfluss der Milchsäure auf die Milchsäuregärung*. [The effect of lactic acid on lactic acid fermentation.] *Biochem. Zeitschr.* 128: 465-481. 1922.—The author points out the lack of consistency in dissociation constants as previously determined and the causes of the errors and makes a new study of this point by conductivity, also by the electrometric and the colorimetric method of determining H-ion concentration. His results indicate that 1.5×10^{-4} is a proper constant at 25°. A definite concentration of the acid in undissociated form appeared to check lactic fermentation in peptone broth, irrespective of the buffer action of the latter. The dissociation constant was found to vary at different times, which was ascribed to the action of factors unknown rather than to age of culture. Optical modification did not appear to affect physiological action of the lactic molecule; the dextro and laevo forms have practically the same dissociation constant. A *d*-lactic acid-forming bacterium is checked by the lactic acid molecule of either optical characteristic.—W. W. Bonns.

4534. JACOBY, M. *Über den Formaldehyd als Übergangsstufe zwischen der eigentlichen Assimilation und der Kohlenhydratbildung in der Pflanze. II Mitteilung*. [Formaldehyde as the intermediate between specific assimilation and carbohydrate formation in the plant. II Contribution.] *Biochem. Zeitschr.* 128: 119-121. 1922.—Leaves of *Tropaeolum majus* in an atmosphere of HCHO increased in dry weight over control leaves. This gain occurred both in the presence and absence of O₂. [See also Bot. Absts. 12, Entry 774.]—W. W. Bonns.

4535. JACOBY, M. *Ueber künstliche Zymogene. II Mitteilung*. [Artificial zymogens. II Contribution.] *Biochem. Zeitschr.* 128: 80-88. 1922.—The author, using the Tschugaeff tests for minute quantities of nickel, has determined the effect of this element, both as nickel

powder and as nickel oxide, on urease solutions, in the presence and absence of potassium cyanide. The experiments indicate a reversibility of active and inactive stages.—W. W. Bonns.

4536. JACOBY, M., und T. SHIMIZU. Ueber die Adsorption von Fermenten und Zymogenen. I. Mitteilung. [The adsorption of enzymes and zymogens. I. Contribution.] Biochem. Zeitschr. 128: 100–102. 1922.—Urease solutions were treated with freshly made $\text{Ca}_3(\text{PO}_4)_2$, with NaCl, and with Na_2SO_4 . The first did not adsorb the enzyme in appreciable amounts, but the latter 2 did so in 10 per cent concentrations. The enzyme inactivated by Ni or Co was likewise adsorbed, and could be reactivated by KCN. Dibasic calcium phosphate adsorbed neither urease nor its inactive form.—W. W. Bonns.

4537. JACOBY, M., und T. SHIMIZU. Ueber die Adsorption von Fermenten und Zymogenen. II. Mitteilung. Cholesterin-Wirkungen auf die Urease. [The adsorption of enzymes and zymogens. II. Contribution. The effect of cholesterin on urease.] Biochem. Zeitschr. 128: 103–107. 1922.—The addition of small amounts of 10 per cent NaCl and alcoholic cholesterol solutions to 0.3 per cent urease solution had no apparent adsorptive effect. If the mixture is filtered, low activity results in both filtrate and residuum, and combining them again gives even less action. The addition of glyocoll or serum to a filtrate with such reduced activity results in reactivation. No explanation is offered for the results.—W. W. Bonns.

4538. JACOBY, M., und T. SHIMIZU. Ueber künstliche Zymogene. III Mitteilung. Ueber die Einwirkung von dem Nickel nahestehenden Metallen auf die Sojaurease. [Artificial zymogens. III Contribution. The effect of metals close to nickel (in atomic series) on soy bean urease.] Biochem. Zeitschr. 128: 89–94. 1922.—Ni, Cu, Co, and Zn inactivate urease, but Fe does not. The action of Ni is slower than that of Co, Cu, or Zn, the latter causing strong inactivation even in small quantities. The results appear to support Jacoby's view that the ability of the metals to form compounds with KCN or with amino acids bears on the explanation of their combination with urease and other enzymes to form zymogens.—W. W. Bonns.

4539. JACOBY, M., und T. SHIMIZU. Ueber künstliche Zymogene. IV Mitteilung. Ueber die Inaktivierung und Reaktivierung der Takadiastase. [Artificial zymogens. IV Contribution. The inactivation and reactivation of taka diastase.] Biochem. Zeitschr. 128: 95–99. 1922.—Taka diastase was not rendered inactive by either Ni, Co, Cu, or Fe. It was inactivated by HgCl_2 , and reactivated by KCN.—W. W. Bonns.

4540. JONESCO, ST. Transformation d'un chromogène des fleurs jaunes de *Medicago falcata* sous l'action d'une oxydase. [Transformation of a chromogen of the yellow flowers of *Medicago falcata* under the action of an oxydase.] Compt. Rend. Acad. Sci. Paris 175: 592–595. 1922.—Eleven chemicals are given which may be used in changing the color of the pigment. It is concluded from the tests that the pigment is not a tannin, but a phenol. It is found that it is by oxidation and not by reduction that it is transformed into a violet pigment of anthocyanic nature.—C. H. Farr.

4541. KOLKWITZ, R. Ueber den durch Hefegärung entstehenden Druck. [Pressure produced by yeast fermentation.] Ber. Deutsch. Bot. Ges. 39: 219–223. Fig. 1. 1921.—An apparatus is described and illustrated whereby the pressure produced by yeast during fermentation can be measured. Fermenting yeast produced pressures as high as 24–40 atm. in 3–4 hours. The author states that normally fermentation by yeast is inhibited at about 12 atm. or less, due to the toxic action of the accumulating CO_2 , alcohol, and organic acids, rather than the increased pressure. In the apparatus described a high pressure can be obtained in a relatively short time, before the inhibiting effect of the products of fermentation is produced.—W. C. Muenscher.

4542. KOSER, STEWART A. *Bacillus Welchii* in bread. Jour. Infect. Diseases 32: 208-219. Pl. 1. 1923.—Organisms of the *B. Welchii* type were found in a commercial "starter" used in making salt-rising bread, which organisms were present within the baked loaf in much larger numbers than in ordinary yeast bread. It appears that the Welch bacillus was the active agent in the starter.—R. L. Starkey.

4543. KOSSEL, A. Über physiologische Umformung von Eiweisskörpern. [On the physiological transformation of protein bodies.] Naturwissenschaften 10: 999-1005. Fig. 1-7. 1922.—This is a brief general discussion of the subject.—C. C. Epling.

4544. MIRANDE, MARCEL. Sur la relation existant entre l'anthocyanine et les oxydases. [Relation existing between anthocyanin and the oxydases.] Compt. Rend. Acad. Sci. Paris 175: 595-597. 1922.—It is found that all of the cells in the scales of bulbs in which anthocyanin is produced in light, and only those cells, contain oxydase. It is demonstrated that O_2 is necessary in the production of anthocyanins.—C. H. Farr.

4545. NEUBERG, C., und J. HIRSCH. Zur Klassifikation der Carboligase. [The classification of carboligase.] Biochem. Zeitschr. 128: 608-609. 1922.

4546. NEUBERG, C. und H. OHLE. Zur Kenntnis der Carboligase. IV Mitteilung. Weitere Feststellungen über die biosynthetische Kohlenstoffkettenverknüpfung beim Gärungsvorgänge. [Concerning carboligase. IV Contribution. Further proof of the biosynthetic carbon chain connections in fermentation processes.] Biochem. Zeitschr. 128: 610-618. 1922.

4547. PALLADIN, W., und H. POPOFF. Ueber die Entstehung der Amylase und Maltase in den Pflanzen. [The origin of amylase and maltase in plants.] Biochem. Zeitschr. 128: 487-494. 1922.—A condensed review of previous work on these plant enzymes and a brief description of the authors' experiments with abscised leaves, green and etiolated, of *Robinia*, *Platanus*, and *Ricinus* is given. Such material, subjected to autolysis at high summer temperatures for periods of 1-23 days, contained active diastase in the protoplasts. More enzyme was found in young leaves than in old ones and none in fallen dead leaves. Boiling after autolysis destroyed the enzyme. Diastase in leaves appears almost wholly in combination with the protoplast, but in the course of autolysis the enzyme thus bound splits off and passes into solution. The nature of the enzyme-protoplast combination is not known.—W. W. Bonns.

4548. SANDBERG, M. Ueber den Verlauf der alkoholischen Gärung in Gegenwart von Harnstoff. [The course of alcoholic fermentation in the presence of urea.] Biochem. Zeitschr. 128: 76-79. 1922.—The addition of urea to sucrose solutions consistently decreased alcohol production in fermentation by 3 different bottom yeasts. Quantitative determinations indicate that the urea is not utilized in the process.—W. W. Bonns.

4549. SEARS, H. J., and JOHN J. PUTNAM. Gas production by bacteria in symbiosis. Jour. Infect. Diseases 32: 270-279. 1923.—Gaseous fermentation of substances was determined by various pairs of organisms growing in symbiosis, neither of which could produce the gas alone from these substances. Gas was produced only when an acid-former capable of fermenting the sugar was mixed with a gas-former not able to produce gas from this sugar. No quantitative relationships were noted as to the numbers of each organism that should be present. The symbiosis is not a simple gas production by the gas-former from the acid produced by the acid-former.—R. L. Starkey.

4550. VILMORIN, JACQUES DE, et CAZAUBON. Sur la catalase des graines. [The catalase of seed.] Compt. Rend. Acad. Sci. Paris 175: 50-51. 1922.—In peas a direct relation is found between the amount of catalase and the degree of vitality of the seed. But in certain trees, such as pines and larch, the catalase content of the seed appears to be independent of the vitality.—C. H. Farr.

4551. WESTER, D. H. Ueber den Einfluss von verschiedenen Kationen und Anionen und von Elektrolyt-Mischungen auf die harnspaltende Wirksamkeit von Urease. [The effect of different cations, anions, and mixtures of electrolytes on the urea-cleaving action of urease.] Biochem. Zeitschr. 128: 279-292. 1922.—Urease action in soy bean and canavalia bean extracts was reduced in presence of tannin, iodine, or copper sulphate. It was not noticeably affected by chloroform, thymol, or mustard oil when these were added in amounts sufficient to inhibit bacterial growth. Neither methyl nor ethyl alcohol had any effect on urease activity in concentrations of 1 mol per liter, but amyl alcohol proved slightly inhibitory. With respect to their inhibitive power, the ions studied may be graded in ascending order in several groups comparatively studied as follows: K, Na, Ba; I (Cl, Br, NO₃), SO₄; K, Li. K₂SO₄ plus LiSO₄ had less effect than the sum of the effects of each. Ammonium chloride used alone increased activity, while in presence of other salts it reduced the inhibitory action of the latter.—W. W. Bonns.

METABOLISM (RESPIRATION, AERATION)

4552. ATKINS, W. R. G. The respirable organic matter of sea water. Jour. Marine Biol. Assoc. United Kingdom [Plymouth] 12: 772-780. 1922.—On storing, sea water suffers a decrease in pH value due to the production of carbonic acid by organisms; this probably indicates the amount of plankton present, at least when sewage contamination is negligible. It appears that water near the surface, at 20-25 m., and sometimes at the bottom, 70 m., is particularly subject to change during storage. The total amount of carbon, reckoned as hexose, which is set free by respiration during storage in sea water at 5 m. is about twice that photosynthesized between July and December, taking for the latter the minimum value 3 mgm. per l., giving a total of 6 mgm. per l.—Marshall A. Howe.

4553. COMBES, RAOUL, et DENISE KOHLER. Rôle de la respiration dans la diminution des hydrates de carbone des feuilles pendant le jaunissement automnal. [The rôle of respiration in the diminution of carbohydrates in leaves during autumnal yellowing.] Compt. Rend. Acad. Sci. Paris 175: 406-409. 1922.—Sachs held that all of the substances useful to the tree passed into it from the leaves before the latter fell in the autumn. Wehmer was one of the first plant physiologists to show that this is not the case. *Fagus silvatica*, *Aesculus Hippocastanum*, and *Ampelopsis hederacea* are here studied in this connection. It is concluded that much of the decrease in carbohydrate content of the leaves during yellowing is due to respiration. Some is carried off by washing with rain, and some migrates to the stem.—C. H. Farr.

4554. HARRINGTON, GEORGE T., and WILLIAM CROCKER. A new and efficient respirometer for seeds and other small objects: directions for its use. Jour. Agric. Res. 23: 101-115. Pl. 1, 2 fig. 1923.—With the apparatus described, O₂ consumption and CO₂ production are determined in the same apparatus, for the identical period of time, and with the use of the whole volume of air instead of a sample of it. The gaseous exchanges are determined, at the end of an experimental period, by means of a manometer which is an integral part of the apparatus. Useful tables and directions for making computations are included. A bibliography of 32 titles is appended.—D. Reddick.

4555. MOLLIARD, M. Influence de la nature de l'aliment azoté sur les échanges gazeux. [Influence of the kind of nitrogenous nutrition on gaseous exchange.] Rev. Gén. Bot. 35: 6-23. 1923.—*Sterigmatocystis nigra*, *Stichococcus bacillaris*, and *Isaria densa* were studied and the author's conclusions are as follows: (1) nitrates and other nitrogenous substances, such as sodium urate, increase the respiratory quotient, as well as the intensity of intramolecular respiration of both autotropic and heterotropic plants; (2) this action is of a catalytic nature; (3) asparagin, leucin, and glycocol constitute for *Isaria densa* a complete organic food; (4) egg albumen is a complete organic and mineral food for *Isaria densa*; on this account albumen and diverse protein substances are more profoundly attacked in the absence than in the presence of sugar; (5) the respiratory quotient is higher in the presence than in the absence of sugar for those substances furnishing both carbon and nitrogen.—J. C. Gilman.

4556. STOKLASA, J. Sur la respiration des racines. [The respiration of roots.] Compt. Rend. Acad. Sci. Paris 175: 995-997. 1922.—Nineteen species of plants are studied and the effect of radioactivity on CO₂ liberation determined. In all cases it is found that the liberation is greater with radioactivity than without it.—C. H. Farr.

4557. THUNBERG, T. Besteht ein genetischer Zusammenhang zwischen dem eingeatmeten Sauerstoff der ausgeatmeten Kohlensäure? [Is there a genetical relation between the inspired oxygen and the respired carbonic acid?] Naturwissenschaften 10: 417-420. 1922.

ORGANISM AS A WHOLE

4558. ATKINS, W. R. G. The hydrogen ion concentration of sea water in its biological relations. Jour. Marine Biol. Assoc. United Kingdom [Plymouth] 12: 717-771. 1922.—The paper is largely physico-chemical, but the biological relations of the algae to the composition of the sea water are involved. Sea water may become as alkaline as pH 9.7 as the result of very active photosynthesis, in virtue of the presence of magnesium salts. The salt-water tanks of the Plymouth laboratory are always less alkaline than the water of Plymouth Sound. The water of the Sound varies slightly with the state of the tide; a drop of 0.05 pH may be observed between high and low water and during July is more alkaline than that of the open sea. Over *Laminaria* in shallow water, through which the tops of the algae appear, the water may be 0.15 pH more alkaline than the general mass of water. Rock pools in summer may be at least as much as 0.25 pH more alkaline than the Sound water.—Marshall A. Howe.

4559. ATKINS, W. R. G. The influence upon algal cells of an alteration in the hydrogen ion concentration of sea water. Jour. Marine Biol. Assoc. United Kingdom [Plymouth] 12: 789-791. 1922.—Sea water originally at pH 8.2 became as alkaline as pH 9.4 by the photosynthetic action of *Ulva* in removing carbonic acid. This degree of alkalinity did not prove injurious to *Ulva*, but exposure to it for 2½ hours at 27°C. sufficed to increase the permeability of the superficial cells of *Ceramium rubrum* irreversibly and fatally. It is suggested that the above facts have a bearing upon the distribution of these and similar algae upon the shore.—From Author's summary.

4560. COSTANTIN, J. La dégénérescence des plantes cultivées et l'hérédité des caractères acquis. [Degeneracy and the heredity of acquired characters.] Ann. Sci. Nat. Bot. 4: 267-297. Fig. A, B. 1922.—The peculiar physiological adjustments necessary for best development of the potato (*Solanum*) and the formation of good tubers is attributed to the suppression of certain endophytic, tubercle-producing fungi possessed by the ancestor of the cultivated plant. The same principle is discussed in application to other plants and to the acclimatization of plants, especially perennials.—Paul Weatherwax.

4561. DAVY DE VIRVILLE, ADRIEN, et FERNAND OBATON. Observations et expériences sur les fleurs éphémères. [Observations and experiments on ephemeral flowers.] Compt. Rend. Acad. Sci. Paris 175: 637-640. 1922.—Ephemeral flowers are defined as those which ordinarily open only once. They are found to be very sensitive to external conditions. The effects of temperature, humidity, and light were studied with respect to the opening of *Helianthemum guttatum*, *Anagallis arvensis*, and *Phaenopus muralis*. It is found that they can be prevented from opening by keeping the temperature low. Light is found to have no effect and humidity has very little.—C. H. Farr.

4562. DAVY DE VIRVILLE, ADRIEN, et FERNAND OBATON. Sur l'ouverture et la fermeture des fleurs météoriques persistantes. [On the opening and closing of flowers which open more than once.] Compt. Rend. Acad. Sci. Paris 175: 841-843. 1922.—Two types of these flowers are found, the nocturnal and diurnal. They are in general less sensitive to environment than the ephemeral flowers. Examples discussed are *Erythraea Centaurium*, *Taraxacum Dens-leonis*, *Bellis perennis*, and *Leontodon hispidus*. It is found that the opening and closing is largely dependent upon temperature, as stated by Hoffmann in 1850 and by Royer in 1868. Humidity

has very little effect, and light has no effect. But it is still necessary to consider the movement as affected by hereditary periodicity.—C. H. Farr.

4563. DUFOUT, LÉON. Causes de l'apparition, en grande abondance, de certains champignons à la suite d'un incendie de forêt. [Reasons for the appearance of fungi after forest fires.] Bull. Trimest. Soc. Mycol. France 38: 93-97. 1922.—The occurrence of such forms as *Phicaria leiocarpa*, *Aleuria violacea*, and *Geopyxis carbonaria* on recently burned areas may be due to the increased amount of nitrates found in soil after burning. Increased light and aeration are among the factors responsible, as is indicated by the fact that similar fungi are found on areas from which trees have been removed by cutting. In this case however the process extends over a longer period and the fungi do not appear until the second season after the land has been cleared.—D. S. Welch.

4564. EULER, H. VON, und O. SVANBERG. Einige Versuche über die Aciditätsbedingungen des Zuwachses von *Bacillus macerans* und über den Verlauf der Stärkespaltung. [Experiments on the acidity conditions for growth of *Bacillus macerans* and the course of starch cleavage.] Biochem. Zeitschr. 128: 323-326. 1 fig. 1922.—Optimum acidity for growth was found to be close to pH 6.8 when grown on potato starch. Inhibition was marked between pH 5 and pH 6. Starch cleavage was determined by the iodine test, by loss in weight, by total carbohydrate value in terms of glucose, and by the amount of direct reducing compounds. A point is reached where the iodine reaction disappears, but the total carbohydrate value remains constant and the loss in weight as well as the amount of direct reducing substances remains very small (the latter about 1 per cent of the total starch). The reaction of this organism is greatly affected by the composition of the substrate as well as by the temperature. No determinations of specific enzymes were attempted.—W. W. Bonns.

4565. FRANKENTHAL, K. Zur Biologie des Influenzabacillus. [The biology of the influenza bacillus.] Biochem. Zeitschr. 128: 122-123. 1922.—The author discusses the physiological relation of the influenza bacillus to histidine and its growth on histidine-agar.—C. C. Epling.

4566. FRITZ, CLARA W. Experimental cultures of diatoms occurring near St. Andrews, N. B. Contr. Canadian Biol. 1918-1920: 63-66. 1921.—Marine plankton species of diatoms were experimented with in various media and environments. *Melosira hyperborea* can endure a great variety of light conditions, but the optimum development is obtained in strong diffuse light. It can endure a range of 40 degrees in temperature and a diminution to 40 per cent of sea water, even existing for a time in tap water. Increased concentration of sea water is detrimental. Excellent persistent cultures may be obtained in artificial sea water.—Marshall A. Howe.

4567. MAQUENNE, L., and E. DEMOUSSY. Sur la végétation dans des milieux pauvres en oxygène. [Growth on media low in oxygen.] Compt. Rend. Acad. Sci. Paris 174: 1387-1392. 1922.—Pear, radish, wheat, and colza seeds were germinated under water and grown during 14-30 days. It was found that they can develop with the limited amount of O₂ available, as do aquatic plants. If the plants are placed in sunlight and the water is saturated with air and charged with CO₂, O₂ is liberated in bubbles from 1 or 2 places about 10 cm. from the base of the stem much as from the cut surfaces of aquatic plants.—A study is also made of green plants in a vacuum. It is found that longevity and activity vary much with the species studied. Some, notably the sorrel, do not survive longer than 24 hours. The leaf of aucuba, however, was able to assimilate 2.4 cc. of CO₂ in 6 hours after having been a year in a vacuum before a south window. Another leaf under similar conditions showed a liberation of O₂ of 0.5 cc. In darkness, however, they die. The difference in plants is attributed to the $\frac{CO_2}{O_2}$ ratio of respiration.—C. H. Farr.

4568. MÖBIUS, M. Die Vorbereitung der Pflanze für den Winter. [The preparation of the plant for winter.] Ber. Senckenberg. Naturf. Ges. Frankfurt am Main 51: 32. 1921.—A resumé is given of a lecture on the changes undergone by plants during the autumn. The modifications in the pigments and the separation of the leaves, the nature of the leaf-scars, the structure of the winter buds, and the storage of reserve foods are among the topics considered.—A. W. Evans.

4569. REITH, ALLAN F. Growth of Pfeiffer bacillus in mixed culture in blood-free medium. Jour. Infect. Diseases 32: 243-246. 1923.—The Pfeiffer bacillus was grown in blood-free medium when in association with either *Bacillus subtilis* or *Staphylococcus albus*.—R. L. Starkey.

GROWTH, DEVELOPMENT, REPRODUCTION

4570. KOTTE, WALTER. Wurzelmeristem in Gewebekulture. [Cultures of rootmeristem.] Ber. Deutsch. Bot. Ges. 40: 269-272. Fig. 1-3. 1922.—Root meristems (pieces of root tip 1 mm. long, including the root cap) from *Zea Mays* and *Pisum sativum* were isolated and grown under sterile conditions on Knop's solution plus 1.5 per cent agar and glucose with 1 of several sources of nitrogen supplied. Under these conditions the root tips were able to develop into "apparently normal roots" in 10-12 days. The experiments indicate that the cells of isolated root meristem are capable of division and differentiation. The author concludes that if, as Haberlandt assumes, cell division in primary meristems is dependent upon the influence of hormones, the primary meristem of these root tips must be able to supply these hormones.—W. C. Muenscher.

4571. LUDWIG, C. A. The growth of tree twigs. Proc. Indiana Acad. Sci. 1921: 121-131. Charts 1-6. 1922.—Shoots of *Prunus Persica* (L.) Stokes and *Cornus florida* L. were measured during 1 season of growth, showing a slow rate of growth at first, which then increased to a maximum, and later decreased to zero before the temperature had dropped to the point at which growth started in the spring. The slow growth at the beginning of the season is thought to be due to the cool weather, while the decline is thought to be partly due to lack of available moisture, or in some cases to shading. The capacity of the dogwood to grow in shaded situations seems to be due not to the ability to grow in shade, but to endure it. In these branches growing at an angle to the vertical, the terminal shoot of dogwood grows less than the closely set laterals, the outermost of which takes the lead and becomes the main shoot of the branch.—F. C. Anderson.

4572. MASON, T. G. A note on the growth and the transport of organic substances in bitter cassava (*Manihot utilisissima*). Sci. Proc. Roy. Dublin Soc. 17: 105-112. 1 fig. 1922.—Plants were ringed in order to determine whether there was any factor correlating the activity of the cells of the apical meristem and the growth of the tuberous roots. It was found that the rate of growth of the stem in height was not affected by the operation for 3 weeks, when a retardation was observed. The final weight of the tuberous roots of the ringed plants was about a quarter of that of the unringed, whereas the stem was over 1.2 times as heavy. It was concluded that the activity of the cells of the apical meristem was not controlled by the supply of organic substances available, but by autogenous changes. The rate of growth was conditioned by autocatalytic reactions.—W. R. G. Atkins.

4573. PEARL, RAYMOND, and LOWELL J. REED. A further note on the mathematical theory of population growth. Proc. Nation. Acad. Sci. [U. S.] 8: 365-368. 1922.—The equation $y = \frac{be^{ax}}{1 + ce^{ax}}$, as has been shown, represents well the population growth of the U. S. A. More general equations are here discussed, including forms for successive cycles of population growth, as (for any single cycle), $y = d + \frac{k}{1 + me^{a_1x + a_2x^2 + a_3x^3}}$, where d represents the growth previously attained. One special form is "similar in shape to the autocatalytic curve."—Howard B. Frost.

4574. PENNERS, ANDREAS. Über die Rolle von Kern und Plasma bei der Embryonalentwicklung. On the rôle of the nucleus and of the cytoplasm in embryonal development.] *Naturwissenschaften* 10: 728-733, 761-765. 1922.—The subject-matter is briefly reviewed and a short bibliography appended.—C. C. Epling.

4575. RIEDE, WILHELM. Die Abhängigkeit des Geschlechtes von den Aussenbedingungen. [Effect of external conditions on sex.] *Flora* 115: 259-272. 1922.—Riede has continued his studies on the correlation between the stage in the ontogeny of a plant and the quotient represented by the ratio of carbon assimilation to absorption of inorganic salts, and he finds that in *Zea mays* the quotient must be higher for the development of pistillate flowers than for staminate.—A. G. Stokey.

4576. RIPPEL, AUGUST. Die Wachstumskurve. [Growth curve.] *Ber. Deutsch. Bot. Ges.* 37: 169-175. *Fig. 1.* 1919.—The author finds that growth curves plotted from experimental data with plants agree fairly closely with Robertson's formula, but not with Mitscherlich's.—W. C. Muenscher.

4577. TERROINE, ÉMILE-F., et RENÉ WURMSER. Le rendement énergétique dans la croissance de l'*Aspergillus niger*. [Energy production during the growth of *Aspergillus*.] *Compt. Rend. Acad. Sci. Paris* 174: 1435-1437. 1922.—The utilization ratio (0.44) is the ratio of dry weight of *Aspergillus* produced to weight of glucose consumed. The energy value of the original glucose, of the resulting mycelium, and of the CO₂ liberated in the meantime are determined. It is found that $c = p(a + \frac{1}{2}bt)$ if c = the quantity of glucose consumed at the end of the time t , p = the final dry weight, a = constant representing the consumption necessary to maintain 1 gm. of mycelium, b = a constant representing the consumption necessary to maintain 1 gm. of mycelium per hour; then $b = 2 \frac{c_2 - c_1}{p(t_2 - t_1)}$, if c_1 and c_2 represent the consumption necessary to produce p gm. in t_1 and t_2 intervals of time respectively.—C. H. Farr.

4578. WEBER, FRIEDL. Frühtreiben durch Quetschen. [Forcing by squeezing.] *Ber. Deutsch. Bot. Ges.* 40: 148-152. 1922.—The buds of *Syringa vulgaris* were squeezed for short periods of time with screw cocks. Buds treated in this manner would start to develop into shoots very soon when placed in a greenhouse even at the beginning of the dormant period. The author suggests that forcing is here caused by the wound hormones produced in the injured buds.—W. C. Muenscher.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

4579. AZOULAY, LÉON. Sur le rapprochement provoqué et spontané des feuillets de *Russula Queletii* (Fr.) Bataille et ses variétés. [On the spontaneous and induced union of the gills of *Russula Queletii* and its varieties.] *Compt. Rend. Acad. Sci. Paris* 175: 597-599. 1922.—By passing a brush or a sheet of rough paper between the gills it is found that they stick together so that the paper is drawn out with great difficulty. The gills remain in contact until the fungus becomes dry and withered. There appears thus to be a sensitivity analogous to that of *Mimosa pudica*. It is found that the union does not occur in the presence of ether or chloroform.—C. H. Farr.

REGENERATION

4580. LÖFFLER, BRUNO. Experimentelle Untersuchungen über Regeneration des Gipfels und Kontaktempfindlichkeit bei Windpflanzen. [Experiments on regeneration of the tips of twining plants.] *Ber. Deutsch. Bot. Ges.* 37: 6-24. *Fig. 1-8.* 1919.—The author points out that when the terminal buds are removed from young plants of *Phaseolus vulgaris* and *Humulus Lupulus* the upper axillary bud on the side of the stem in contact with a pole or support develops into the main axis. Experiments here reported indicate that this unequal growth is not due to a difference in illumination or to the position of the bud on the stem but is due to the stimulus of contact from the support.—W. C. Muenscher.

GERMINATION, RENEWAL OF ACTIVITY

4581. HARRINGTON, GEORGE T. Forcing the germination of freshly harvested wheat and other cereals. Jour. Agric. Res. 23: 79-100. 1923.—Wheat [*Triticum*], barley [*Hordeum*] and oats [*Avena*] were included in the test. The forcing of wheat seed in particular is necessary in administering seed laws in winter wheat areas, where the interval between harvest and seeding is very short. Dry heat for 8 days at 40°C. was the most satisfactory of the heat treatments tried. Presoaking the seed in water for 1 hour and for 5 hours increased slightly the percentage of germination at the end of 31 hours but at the end of 4 days the percentage of germination in oats and barley was less than for untreated seed. Surface disinfection of seed with 1 per cent silver nitrate solution did not affect germination. Scratching the embryo along its whole length stimulated germination, and removal or weakening the coat structures of wheat by treatment with sulphuric acid was exceedingly effective in inducing complete germination in a minimum length of time. Increasing the amount of oxygen to 36 per cent (optimum) stimulated germination. Most satisfactory germination is secured when the seed bed is of such nature as to furnish abundant moisture for absorption without actually flooding the grains. Incubation of the seeds at a temperature of 12-16°C. gives the best results.—In all cases it appears that the oxygen relation is the important consideration in the germination of not after-ripened seed of cereals.—Some samples of seed after-ripen much more rapidly than others. After-ripening and loss of water are concomitant processes but are independent, and there is no relation between water content of seed and germinability.—D. Reddick.

4582. HARRINGTON, GEORGE T., and BERTHA C. HITE. After-ripening and germination of apple seeds. Jour. Agric. Res. 23: 153-161. 1923.—Seed of the apple require a period of after-ripening. The dormancy is inherent in the embryo itself. After-ripening is accomplished in a few months when the seed are kept moist and at a temperature between 5 and 10°C.; it does not take place in dry seed nor in moist seed which are stored at 20°C. or above. The optimum temperature for germination of after-ripened seed lies between 10 and 20°C. Removal of seed-coats of after-ripened seed hastens germination but it has no effect on dormant seed. On the other hand, removal of seed-coats of seed held under suitable germination conditions but at a temperature too high to effect after-ripening often germinate well upon removal of the seed-coats. The inner seed-coat is effective in preventing the decay of seed.—D. Reddick.

4583. NOBLE, R. J. Studies on *Urocystis Tritici* Koern., the organism causing flag smut of wheat. Phytopathology 13: 127-139. Pl. 10, fig. 1-2. 1923.—A study was made of the germination of the spores of *Urocystis Tritici* Koern. under various conditions in regard to substratum, temperature, aeration, and age of spores. Several organic and inorganic media were tried; none offered any special advantage. In distilled water the percentage germination was very low. Some germination occurred in soil extract, but the percentage was little if any higher than in distilled water. Germination was not stimulated by changing the H-ion concentration with sodium phosphate, by changing the surface tension of the substratum with soaps of fatty acids, or by the addition of various organic acids. Germination was very markedly stimulated when tissue of young wheat plants was added to distilled water in which the spores had soaked for several days. In this case 70-90 per cent of the spores germinated. A decoction made from young wheat plants, or a distillate from this decoction, produced the same effect when added to spores presoaked in distilled water. Tissue from a number of other plants also stimulated germination. The minimum, optimum, and maximum temperatures for spore germination appeared to be 5, 18-24, and 32°C. respectively. Apparently the spores do not require a rest period before germination.—B. B. Higgins.

TEMPERATURE RELATIONS

4584. GAIN, EDMOND. Sur la résistance comparative à la chaleur des points végétatifs de l'embryon du Grand-Soleil. [On the comparative resistance to heat of vegetative points of the embryo of the sunflower.] Compt. Rend. Acad. Sci. Paris 174: 1557-1559. 1922.—The author

showed in a previous paper that sunflower seed may resist a heat of 145–150°C. for 10 minutes and retain germinating power. It might be considered that the embryo has 5 parts: the root meristem, the shoot meristem, the cotyledons, the hypocotyl, and the base of the cotyledons. The root meristem is anatomically exposed, while the shoot meristem is protected by the cotyledons. Experiments show that the root meristem displays the least resistance to heat, and, if it is destroyed, is replaced by the embryonal cells of the axis of the hypocotyl. The shoot meristem is next most sensitive. It is replaced, if killed or inhibited, by the base of the cotyledons or the axis of the hypocotyl. The base of the cotyledons is found to be most resistant.—*C. H. Farr.*

RADIANT ENERGY RELATIONS

4585. BORESCH, K. Ueber die Einwirkung farbigen Lichtes auf die Färbung von Cyanophyceen. [Effect of colored light upon the color of Cyanophyceae.] Ber. Deutsch. Bot. Ges. 37: 25–39. 1919.—The ability of certain Cyanophyceae to react to the color of the incident light by absorbing a complementary color was shown for *Phormidium foveolarum* in experiments in which light was passed through a spectroscope or color screen. This chromatic adaptation is not related to the discolorations following the exhaustion of the nitrates of the substratum. It was demonstrated that in *Phormidium foveolarum* the discoloration due to colored light depends upon the development of various phycocyanin modifications.—*W. C. Muenscher.*

4586. HARVEY, R. B. Growth of plants in artificial light. Bot. Gaz. 74: 447–451. Fig. 1–2. 1922.—Nitrogen-filled tungsten filament (Mazda) lamps were used. The lamps were placed 5 feet from the plants; reflectors were used. The 1,000 watt lamps proved most economical, lasting for 4 months. The lamps furnished all heat necessary in the basement rooms used. The small grains, flax, buckwheat, white sweet clover, peas, beans, lettuce, and a number of common weeds were successfully grown from seed to maturity in the continuous light and all set good seed. Other plants such as potato, red clover, and squash blossomed but did not set seed. Potato tubers of good size were obtained. With none of the plants was it necessary to furnish a definite illumination period in order to obtain bloom. The author has shown it possible “to produce seed from plants in winter, independent of sunlight, and at no very great expense.”—*B. W. Wells.*

4587. MIRANDE, MARCEL. Influence de la lumière sur la formation de l'anthocyanine dans les écailles des bulbes de lis. [The influence of light on the formation of anthocyanin in the scales of lily bulbs.] Compt. Rend. Acad. Sci. Paris 175: 496–498. 1922.—This is a study of the effect of intensity of light on anthocyan formation. Anthocyan is produced only in diffuse light, but not at all altitudes. For instance it is formed at 300 m., but not at 2,000. Six intensities were used in the experiments, varying from 53 to 7 per cent. At 300 m. no redness is found in 53 per cent; it begins in 39 per cent and reaches a maximum in 22 per cent. At 600 m. redness begins in 22 per cent and the maximum is reached in 13. At 2,000 m. redness begins in 13 and the maximum is in 7 per cent. It is concluded that the visible rays of the spectrum are favorable to reddening, but the ultraviolet and infra red are unfavorable. A study with Wratten filters shows that blue and indigo are most active, red light somewhat, and green not at all.—*C. H. Farr.*

4588. MIRANDE, MARCEL. Sur la formation d'anthocyanine sous l'influence de la lumière dans les écailles de bulbes de certains lis. [The formation of anthocyanin under the influence of light in the scales of the bulbs of certain lilies.] Compt. Rend. Acad. Sci. Paris 175: 429–430. 1922.—Bulb scales of lily are favorable for the study of anthocyanins. Detached scales do not form anthocyan in the absence of light.—*C. H. Farr.*

4589. PETRY, E. Zur Kenntnis der Bedingungen der biologischen Wirkungen der Röntgenstrahlen. II Mitteilung. [The conditions of biological action of X-rays. II Contribution.] Biochem. Zeitschr. 123: 326–353. 1922.—Seed of various economic plants at different

stages of water content were used. A brief period of water absorption ("Quellung") was found to increase susceptibility to X rays, in both dried seeds and dried seedlings. Such susceptibility is explained as a function of hydration degree, analogous to heat injury of plant members, enzymes and albumens. Swelling in the absence of oxygen and under experimental conditions of inhibited germination does not reduce the relation of germination to ray susceptibility. Dried seedlings were generally more susceptible than resting dried seeds. The explanation is an increased susceptibility due to chemical processes of germination.—*W. W. Bonns.*

4590. WEBER, F. **Frühtreiben ruhender Pflanzen durch Röntgenstrahlen.** [Forcing of resting plants with X-rays.] *Biochem. Zeitschr.* 128: 495-507. 1922.—Winter buds of *Syringa vulgaris* responded to X-ray treatment by shortening the rest period. The "dosage" necessary for such effect is high, the maximum being 150 units, the minimum 26. Stronger doses resulted in necrosis and subsequent cropping of buds. The region of greatest susceptibility to the rays appears to be the basal zone of the bud parenchyma, the so-called "oxalate nest"; embryonic cells of the growing tip are less sensitive. As possible explanations of X-ray effects are listed enzyme activation, permeability alteration, respiration increase, and wound hormone formation.—*W. W. Bonns.*

TOXIC AGENTS

4591. BOAS, FRIEDRICH. **Die Wirkungen der Saponinsubstanzen auf die pflanzliche Zelle.** [The effects of saponins upon the plant cell.] *Ber. Deutsch. Bot. Ges.* 40: 249-253. 1922.—In dilute concentrations cyclamin and digitonin stimulate fermentation in yeast but in concentrated solutions fermentation is inhibited. The effect of cyclamin and digitonin is produced by combining with cholesterol of the cell. The precipitation of cholesterol disturbs the structure of the plasma and death follows. No relationship was found between the surface tension of saponins and their effect upon fermentation.—*W. C. Muenscher.*

4592. BOYLE, C. The growth relations of certain fungi to their staling products. [Abstract.] *Phytopathology* 13: 33-34. 1923.

4593. COBET, R., und V. VON D. REIS. **Ueber den Einfluss der arsenigen Säure auf das Bakterium Wachstum. Nebst Bemerkungen über Randwulstbildungen durch sogenannte oligodynamische Metallwirkung.** [The effect of arsenical acids on bacterial growths, with observations on marginal aggregations as the result of the so-called oligodynamic effect of metals.] *Biochem. Zeitschr.* 129: 73-88. *Fig. 1, 2.* 1922.—Placing arsenious acids in the center of agar plates sown with bacteria results in a sterile zone in the immediate vicinity, with a region of specially strong growth contiguous thereto. This is not accounted for as a toxin stimulus. Increased bacterial growth is not due to the presence of the acid. Analogous results are obtained by substituting a silver coin for the acid.—*W. W. Bonns.*

4594. MOLLIARD, MARIN. **Influence des sels de cuivre sur le rendement du Sterigmatocystis nigra.** [Influence of copper salts on the yield of *Sterigmatocystis nigra*.] *Compt. Rend. Acad. Sci. Paris* 175: 838-841. 1922.—The yield is the ratio of weight of mycelium to the weight of sugar consumed. It is found that copper retards the growth and also reduces the yield, that is, the amount of mycelium formed per gm. of sugar. However the sugar (7 gm.) disappears entirely in 10 days without copper, and lasts for 40 days with copper sulphate.—*C. H. Farr.*

4595. NICHOLAS E., et G. [NICOLAS.] **Influence du formol sur les végétaux supérieurs.** [Influence of formalin on higher plants.] *Compt. Rend. Acad. Sci. Paris* 175: 1437-1439. 1922.—The bean was studied as to growth in diameter and increase in weight in various solutions. The control was in Knop's solution. Other solutions contained, in addition to the salts in Knop's solution, 0.321 gm., 0.803 gm., and 1.606 gm. of formalin respectively. The last named solution was markedly toxic. Aerial parts produce greater weight in 0.321 gm.,

but the roots weigh slightly less than in the control. In 0.803 gm. the roots weigh much less, and the aerial parts about the same. It is stated that 0.321 gm. contains 125 mgm. of formaldehyde, which corresponds to 1 dgm. of hexamethylenetetramine. It is concluded that formaldehyde acts in this concentration as a food for the chlorophyll.—*C. H. Farr.*

4596. NICHOLAS, E., et G. [NICOLAS.] L'action de l'hexaméthylènetétramine sur les végétaux supérieurs. [The effect of hexamethylenetetramine on higher plants]. Compt. Rend. Acad. Sci. Paris 175: 836-838. 1922.—The effect of this compound, $(\text{CH}_2)_6\text{N}_4$, on the bean in culture solution is studied. 0.1-0.25 gm. per l. of Knop's solution gives slight stimulation, shown by increased weight of the plant; 0.5-1.5 gm. per l. has a markedly injurious effect, retarding digestion in the cotyledons.—*C. H. Farr.*

4597. PIERI, C. Su alcune alterazione nel ricambio materiale di vegetali che vivono in atmosfera contenente anidride solforosa. [On some alterations in the constitution of plants in an atmosphere containing sulphuric anhydrid.] Mem. Soc. Toscana Sci. Nat. 32: 173-186. 1919.—Young specimens of *Pinus pinea* were subjected to fumes containing sulphuric anhydrid. Analyses of the ash from these plants indicated that the amount of calcium diminished perceptibly, magnesium and silicon slightly, while that of sulphur increased noticeably in proportion to the strength of the gas.—*Edith K. Cash.*

4598. STOKLASA, J. Influence du sélénium sur l'évolution végétale, en presence ou en absence de radioactivité. [The influence of selenium on plant development, in the presence or absence of radioactivity.] Compt. Rend. Acad. Sci. Paris 174: 1256-1258. 1922.—A study was made of *Hordeum distichum*, *Zea mays*, *Polygonum fagopyrum*, *Vicia faba*, *Soja hispida*, and *Lupinus angustifolius* in culture solution. Selenites and alkaline seleniates were added to the amount of $5 \cdot 10^{-6}$ - 10^{-2} atom-gm. per l. It is found that very weak sodium selenite produces a stimulating effect, especially on corn. The higher concentrations are, however, very toxic and finally result in death. If radium is added to the extent of 0.0000056 mg. per plant per day, the plants in all cases showed 2-15 times the dry weight of plants without emanation. It is found that the emanations completely neutralize the toxic effect of the sodium selenite.—*C. H. Farr.*

ELECTRICITY AND MECHANICAL

4599. BERSA, E., und F. WEBER. Reversible Viskositätserhöhung des Cytoplasmas unter der Einwirkung des elektrischen Stromes. [Reversible increase in the viscosity of cytoplasm by the electric current.] Ber. Deutsch. Bot. Ges. 40: 254-258. 1922.—A method outlined by Weber making use of the cataphoretic migration velocity of colloidal particles, that is, of the starch particles or "statoliths," was used to determine whether the cytoplasmic viscosity changes with the passing of an electric current. With *Phaseolus multiflorus* the author finds that the increased viscosity due to the action of the current is not only appreciable but is also reversible, since after a short period of time the protoplasmic viscosity almost or completely reaches the normal viscosity level.—*F. S. Howlett.*

4600. SCHAFFERS, V. La foudre et les arbres. [Lightning and trees.] Compt. Rend. Acad. Sci. Paris 175: 1087-1089. 1922.—The electrical potential of discharge of twigs was measured, as of metal points. A normal, freshly picked leaf was fixed to a 2 cm. disc, isolated, and positively charged with a static machine. The leaf was connected with the ground through a galvanometer. Sixteen kinds of trees were tested. Figures are given for the galvanometer readings and these compared with the percentages of trees of each species struck by lightning as given by Vanderlinden for 1884-1901 in Belgium and by Prohaska in Styria and Carinthia (Austria). No correspondence is found between the lists, hence it is concluded that trees do not protect against lightning.—*C. H. Farr.*

4601. STERN, KURT. Über polare elektronastische Erscheinungen. [Polar electrical phenomena.] Ber. Deutsch. Bot. Ges. 39: 3-10. Fig. 1-4; 11-20. 1921; 40: 43-51. Fig. 1-2: 54-59. Fig. 1. 1922.—Continuing earlier work the author has studied the effect of electrical

stimulation upon several plants. *Berberis nitens* and *B. vulgaris* var. *atropurpurea* showed a strong stimulation of the stamens at the negative electrode with a discharge from a condenser of 36 volts. *B. vulgaris* var. *microphylla* showed no distinct polarity. The leaves of *Biophytum sensitivum* reacted at the negative electrode and the stimulus went toward the positive with 12 volts, but with 60 volts the reaction was at both electrodes. The leaves of *Mimosa Spegazini* were stimulated at the positive electrode with all voltages used. Those of *M. pudica* were stimulated at the negative electrode with 40 volts, direct current, and at the positive electrode with 250 volts. If the circuit was left closed the leaves recovered. Upon opening the circuit there was no response, or a weak one at the positive electrode under strong stimulation. This result was not the same as obtained with animal tissue. It was pointed out that there are other factors than the length of tissue between the electrodes which determines the amount of current which flows. By reversing the current it could be determined whether the reaction at one electrode was due to polarity or to a difference in current intensity at that node. The conduction of stimuli and the reaction time of nodes are discussed with reference to the interpretation of results. Also the effect of leaflets touching each other and the grounding of the pot, thus allowing the current to be divided. It is suggested that sleep movements of plants may be due to changes in conductivity of the air and in potential, thus affecting the currents which naturally pass through the plant, since these movements were interfered with when the plant was insulated from the ground. Using the precautions referred to and gradually increasing the potential it was found that the stimulation of leaves was decidedly stronger at the negative electrode in the majority of cases; in some cases equal or opposite. Sometimes different polarity was obtained with leaves of different ages, but this needs further investigation. The nature of the polarity depends upon internal factors as well as upon the character of the current. The effect of H-ion concentration has not been sufficiently investigated.—*H. H. Clum.*

MISCELLANEOUS

4602. MANLEY, J. J. On the production of coloured flames for use with spectrometers and polarimeters. London, Edinburgh and Dublin Phil. Mag. 45: 336-337. 1 fig. 1923.—A glass tube with bulb is fitted to a vitreosil pipe of 1 mm. bore. Three or 4 fine platinum wires inserted in the latter serve as a wick to deliver solutions of chlorides of appropriate metals to the Bunsen flame.—*W. R. G. Atkins.*

4603. WEATHERWAX, PAUL. The popping of corn. Proc. Indiana Acad. Sci. 1921: 149-153 1922.—Popping of corn is due to the expansion, under pressure, of moisture contained in the starch grains. The hardness of the endosperm is responsible for the difference between popping and non-popping varieties of corn. For successful popping, the heat must be applied rapidly enough to generate steam faster than it escapes, and slowly enough to allow hydrolysis of most of the starch before the explosion occurs. A temperature of 175°-200°C. reached in 2.5-3 minutes yields best results.—*F. C. Anderson.*

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 3655, 3662, 3666, 3667, 3669, 3674, 3681, 3689, 3691, 3693, 3699, 3702, 3705, 3706, 3708, 3798, 3800, 3822, 3825, 3826, 3905, 4069, 4080, 4470, 4472, 4473, 4513, 4517, 4522)

4604. ANONYMOUS. Sub-soiling. Preliminary report of a trial of sub-soiling devices held at High Hildon, Tonbridge, in October, 1922. Jour. Ministry Agric. Great Britain 29: 911-919. 1923.

4605. AMSTEL, J. E. VAN. Algemeen overzicht van ligging en bodem van Suriname. [General review of situation and soil of Surinam.] West Indie 6: 18-24. 1921.—A general discussion of the soils of Surinam in relation to agriculture is presented.—*J. C. Th. Uphof.*

4606. AMSTEL, J. E. VAN. **Chemisch onderzoek van eenige Surinaamsche kleigronden.** [Chemical observations of some clay soils of Surinam.] Dept. Landb. Suriname Bull. 41. 33 p. 1921.—The clay soils of Surinam, though apparently uniform, show many differences. Though sticky and plastic when wet, in the dry season they are characterized by their hardness and broad shrinkage checks. They have high water-absorbing power, strong capillarity and evaporating power, and contain a large amount of colloidal silicates. The effect of applications of organic substances, lime, potash, phosphorus, and nitrogen is considered.—*J. C. Th. Uphof.*

4607. ARNHOLD, FRITZ. **Über die Bedeutung des Schlicks als Mittel zur Pflanzenernährung und Bodenverbesserung.** [On the importance of mud for plant nutrition and soil improvement.] Landw. Jahrb. 53: 205–250. 1923.—Sea mud originates from the interaction during tides of soluble and suspended particles in rivers with salts and suspended matter in sea water, while river mud originates from the settling of suspended matter in the water when the stream velocity diminishes. Sea mud is a uniform mixture of clay, silt, lime, and humus particles with organic matter of plant and animal origin. When fresh it is plastic, fatty, dark brown; when stored it is light gray and has been found useful as a manure and also for plant protection, and for curative purposes in veterinary and human medicine. For manurial purposes 80–100 cubic m. (25,000 kgm.) are applied per hectare, especially on light and peat soils; various plants, especially legumes, are favorably affected.—The mud contains about 7 per cent Ca, 0.8 per cent Mg, 0.2 per cent P_2O_5 , and 9.5 per cent N, and consists chiefly of colloidal silicic acid, lime, clay, and humic substances. River mud has a higher content of finer particles, of P and N, but less, K, Mg, and Ca. Sea mud is rich in algae and often contains diatoms, and has a high Ca content due to the presence of shells. Among the bacteria found in the mud are *Azotobacter*, *Radiobacter*, butyric acid and legume bacteria, sulphur bacteria oxidizing H_2S to sulphate, and nitrifying and nitrate-reducing bacteria. The favorable results from mud for soil improvement are due to the influence on the physical condition of the soil, the addition of nutrients, and the introduction of active bacteria.—*S. A. Waksman.*

4608. BALDWIN, I. L., U. L. COBLE, and J. W. CHAMBERLAIN. **Crop rotation as affecting nitrate production.** Proc. Indiana Acad. Sci. 1921: 283–293. Pl. 1. 1922.—Experiments to determine the effect of corn, wheat, oats and soybeans, and crop rotation on the nitrate content and nitrifying power of the soil are described. Results showed that cultivation greatly increased the rate of nitrate formation; that the addition of lime to acid soil improved conditions for the development of nitrifying bacteria; and that the growing crop and the soil treatment are more important than the effect of previous treatment of soil on nitrate production. The rate of nitrate production is not necessarily a limiting factor to plant growth.—*F. C. Anderson.*

4609. BALDWIN, I. L., W. E. WALTERS, and F. K. SCHMIDT. **Fertilizer treatment as affecting nitrate production.** Proc. Indiana Acad. Sci. 1921: 295–309. 1922.—Experiments showed that cow manure was more efficient than horse manure. "Use of nitrogen with phosphorus or potassium was superior to either of the treatments used alone." Ammonium sulphate-treated samples seemed to show greatest nitrifying power in May, June, and July. There seems to be a correlation "between the amount of nitrate found in the soil under natural conditions with growing crops and the amount accumulating under optimum conditions."—*F. C. Anderson.*

4610. BERTRAND, G., et MOKRAGNATZ. **Sur la présence du cobalt et du nickel dans la terre arable.** [The presence of cobalt and nickel in arable land.] Compt. Rend. Acad. Sci. Paris 175: 112–114. 1922.—In the samples of soil studied the cobalt content was 0.0028–0.0039 gm. per kgm. of soil, and the nickel 0.0136–0.0174 gm. per kgm.—*C. H. Farr.*

4611. FRAPS, G. S. **Organic constituents of the soil.** Texas Agric. Exp. Sta. Bull. 300. 14 p. 1922.—The determination of organic carbon in the soil throws little light upon the soil quality and is unnecessary since the percentage can be judged from the percentage of nitro-

gen present. The average percentage of pentosans increases with the average nitrogen content. Pentosans from cottonseed meal disappeared rapidly from the soil during the 1st week. At the end of 8 weeks there were present 7 per cent of the original pentosans from cottonseed meal, 31 per cent from Sudan grass, 61 per cent from rice bran, and 75 per cent from sheep excrement. The amount of reducing substance, calculated as sugars, produced by heating the soil with $1\frac{1}{2}$ per cent H_2SO_4 varied from 0.002 to 0.215 per cent with an average of 0.058 per cent for 77 soils.—*L. Pace.*

4612. KELLY, J. W. Probable cause of the toxicity of the so-called poisonous greensand. Jour. Agric. Res. 23: 223-228. 1923.—An investigation of 3 greensands like those of Newcastle, Virginia, Redbank, New Jersey, and Courtland, Virginia revealed the fact that the last is toxic to corn. The toxicity is due to the solubility of Fe, Mn, and Al in slightly acid media. While the other 2 sands contain these toxic substances in nearly like quantity the presence of marl renders them relatively insoluble. The addition of lime to Courtland greensand inhibits its toxic effects.—*L. Knudson.*

4613. KONIG, J., J. HASENBAUMER, und J. SCHÄFERS. Beziehungen zwischen dem Nährstoffgehalt des Bodens und der Nährstoffaufnahme durch die Kartoffel. [On the relation between the nutrient content of the soil and nutrient absorption by potatoes.] Land. Jahrb. 58: 55-85. 1923.—One per cent citric acid extraction furnishes a good index of the content of readily available K and phosphoric acid in the soil. It is important to allow enough citric acid for the $CaCO_3$ present in the soil. The relation between K, N, and phosphoric acid for a proper crop of potatoes should be 100:70:25. The actual amount of fertilizer needed can be determined from the relative composition of a good crop of potatoes and fertilizing elements available. Each 1000 gm. of weight of a normal potato crop requires approximately 25 gm. K, 18 gm. N, and 6 gm. P_2O_5 .—*S. A. Waksman.*

4614. KONIG, J., J. HASENBAUMER, und E. KROGER. Beziehungen zwischen dem Nährstoffgehalt des Bodens und der Nährstoffaufnahme durch den Hafer nebst einem Beitrag über den Einfluss von Pflanzen und Düngern auf die Bodensäure. [On the relation between the nutrient content of the soil and the absorption of nutrients by oats, with a contribution on the influence of plants and manures upon soil acidity.] Landw. Jahrb. 58: 87-124. 1923.—The quantities of artificial fertilizer used in practice are sufficient to exert an influence upon the soil reaction which can be measured, after a certain time, by determining electrometrically or colorimetrically the H-ion concentration in the soil. Growing plants also influence the reaction of the soil. In general, plants increase the acidity of the soil, the degree of change depending on the kind of plant. In the presence of $CaCO_3$ the acids secreted by the plants are neutralized and can thus not be determined. This indicates that alkaline or neutral fertilizing salts should be used for acid soils; in the case of a very high acidity, the favorable influence of the fertilizer is apparent only after a sufficient addition of lime. Alkali soils require physiologically acid salts.—*S. A. Waksman.*

4615. MAZÉ, P. Sur les conditions pratique de l'emploi de la cyanamide calcique comme engrais. [On practical conditions in the use of calcium cyanamide as fertilizer.] Compt. Rend. Acad. Sci. Paris 175: 1093-1096. 1922.—This compound is transformed into urea in the soil by microorganisms. To avoid toxic effects it must be put in the soil several days before seeding. Records given of the yields of wheat and oats show favorable results for this fertilizer, an application at the rate of 40 kg. of N per hectare giving the best results.—*C. H. Farr.*

4616. MITSCHERLICH, E. A., [with the assistance of] F. DURING, C. KRULL, S. V. SAUCKEN, und K. BOHM. Der Düngerversuch (Gefäss- und freiland Versuch). [Fertilizer experiments—pot and field experiments.] Land. Jahrb. 58: 125-158. 1923.—Field experiments present advantages over pot experiments in that plants can be grown to maturity in the same soil. There are, however, many disadvantages, especially the physical and chemical variability of the soil, which may lead to comparatively large errors. This can be obviated by using large

numbers of small plots. Since field tests may suffer from weeds, plants should be selected which require cultivation and which, like potatoes, give large yields. The experimental error can thus be reduced to 1-2 per cent. But due to the lack of uniformity of the soil, the particular experiment holds true only for the particular part of the field. Also, in certain years an unfavorable growth factor (drought) interferes with field experiments yielding conclusive results.—Pot experiments have the advantage that the growth factors, like water, heat, light, and nutrients, can be controlled, and the soil made more representative and uniform. Disadvantages are that the soil is not comparable with the same soil under field conditions, and wrong conclusions may be drawn, and that plants giving greatest yields can not be used because of space required.—Pot experiments are reported on the influence of the N, K, and P fertilizers on oats. The authors conclude that pot experiments should be carried out on a large scale to determine the fertilizer need of the soil. To enable him to use fertilizers most rationally, each farmer is entitled to have his soil properly investigated.—*S. A. Waksman.*

4617. PETIT, A. Sur la nocuite du terreau du fumier. [Concerning the noxiousness of manure compost.] *Compt. Rend. Acad. Sci. Paris* 174: 1362-1364. 1922.—A previous report indicated that manure is a more effective fertilizer after it is leached. Some plants, as *Primula obconica*, are not benefited by such treatment, while others, such as *Cineraria* hybrids, are even injured. It is found that calcium increases the injurious effect of the fertilizer and iron reduces it.—*C. H. Farr.*

4618. ROMELL, LARS-GUNNAR. Luftväxlingen i marken som ekologisk faktor. [Aeration of the soil as an ecological factor.] *Meddel. Statens Skogsförsöksanst.* 19: 125-359. *Fig. 1-6.* 1922.—Movement of gases through the soil takes place primarily by diffusion, the rate being little affected by soil structure or by weather, except that it is greatly reduced in clays and in waterlogged soils. The author finds that a surface layer of organic matter promotes aeration while on bare soils torrential rains may cause a sealing of the surface pores with fine material. A cover of leaf litter, moss, or similar material prevents such action which hinders aeration. On the well-drained moraines and sandy forest soils of Sweden, aeration is not a problem, while waterlogged soils are liable to be poorly aerated. Drainage opens the way for the entrance of oxygen, but the removal of moss and litter is unnecessary, or even harmful. [Summary in German.]—*G. A. Pearson.*

4619. RUSSELL, EDWARD J. Soil conditions and plant growth. 4th ed., xii + 406 p., 32 fig. Longmans, Green and Co.: London, 1921.—The general characteristics of the older editions are retained, the subjects being treated broadly and outlines emphasized. This edition is included in a new series, The Rothamsted Monographs on Agricultural Science. I. Historical and introductory. Development of agriculture from Roman to modern times is treated. During this period the agricultural chemist is acquiring a taste for mathematical formulae and constants unknown to the older generation of workers.—II. Soil conditions affecting plant growth. Such conditions as water and air supply, temperature, and especially the effect of different chemical elements, singly and combined, are discussed.—III. The composition of the soil. The main topics considered are: (1) mineral matter derived from rock material with their physical properties and soil acidity; (2) calcium carbonate and phosphate derived from decomposed organisms; (3) soil solution; (4) organic matter.—IV. The colloidal properties of soil. Relations of soil colloids to absorption of water and the chemicals in the soil solution, and their relation to flocculation of clay and silt and the formation of hard pan are developed. The central part of the thesis is that soil phenomena are dynamic and not static.—V. The carbon and nitrogen cycles in the soil. The decomposition of carbon compounds, the fixation of nitrogen, and denitrification are emphasized and attention called to a number of suggestive lines of work. The biological hypothesis explaining such transformation "remains the simplest and most satisfactory, but there is room for more evidence before it can be regarded as positively established."—VI. The biological conditions in the soil. Water supply is discussed from the point of view of the plant physiologist and ecologist and of the soil physicist. "The soil solution may safely be regarded as the minimum food supply, which is

reinforced to an unknown extent by the soluble substances in the soil." Emphasis is placed on the fact that the soil organisms live on a highly "colloidal complex of organic and inorganic compounds, usually more or less saturated with water, that envelopes the mineral particles. There is no evidence of the presence of soluble toxins in normally aerated soils sufficiently supplied with plant food and with calcium carbonate, but toxins may occur on 'sour' soils badly aerated and lacking in calcium carbonate or on exhausted soils."—VII. The micro-organic population of the soil and its relation to the growth of plants. Algae, fungi, Actinomyces, and bacteria, are regarded as leading their own lives and are not classified as in previous editions according to their usefulness to higher plants. Investigation on the partial sterilization of soil is discussed in connection with soil protozoa.—VIII. The soil in relation to plant growth. Attention is called to the relationship of vegetation to the 5 great soil divisions, clays, loams, sands, calcareous soils, and soils rich in organic matter.—IX. Soil analysis and its interpretation. Soil analysis is restricted to a comparison of soils and to a correlation between "the chemical and physical properties of the soils of a given area and the crops and agricultural methods generally associated with them."—Appendices include a description of methods of soil analysis and tables showing amounts of various substances absorbed from the soil by the common agricultural crops of England. A selected biography of 323 papers on soil conditions and plant growth, and author and subject indices follow.—*Earl S. Johnston.*

4620. RUSSELL, JOHN. The possibility of using town refuse as manure. Jour. Ministry Agric. Great Britain 29: 685-691. 1922.

4621. TULAIKOV, N. Drought and the means of overcoming its evil effects in the Volga region of European Russia. Jour. Amer. Soc. Agron. 15: 6-15. 1923.—An efficient system of field agriculture, introduction of methods of cultivation used by the experiment stations, improvements of methods in all branches of agriculture, and use of water resources are suggested to combat the evil effects of drought in southeastern Russia.—*F. M. Schertz.*

4622. VERNADSKY, W. J. Sur le problème de la décomposition du kaolin par les organismes [The problem of the decomposition of kaolin by organisms.] Compt. Rend. Acad. Sci. Paris 175: 450-452. 1922.—Murray and Irvine reported that diatoms could live successfully in water free of silicon, if it contained a small amount of clay. The author points out that the decomposition of clay liberating silicon is a chemical reaction requiring a large amount of energy, such as a temperature of 1000°C., or the action of strong acids, like H₂SO₄. A study was made of the effect of diatoms and accompanying bacteria upon the decomposition of argillaceous soils to form free aluminium hydrates. It is not determined as yet whether the reaction is the result of the work of the bacteria, the diatoms, or their symbiosis.—*C. H. Farr.*

4623. VINCENT, V. Sur la mesure de l'acidité des sols par les liqueurs alcalines. [On the measurement of the acidity of soils by alkaline solutions.] Compt. Rend. Acad. Sci. Paris 175: 1233-1234. 1922.—Calcium hydrate, sodium bicarbonate, and calcium bicarbonate were used. It is found that calcium hydrate is preferable since in soils treated with this solution the ferric hydrate, aluminium hydrate, and silicon hydrate are precipitated.—*C. H. Farr.*

4624. VOICU, J. Influence de l'humus sur la sensibilité de l'*Azotobacter Chroococcum* vis-à-vis du bore. [The influence of humus on the sensitivity of *Azotobacter Chroococcum* to boron.] Compt. Rend. Acad. Sci. Paris 175: 317-319. 1922.—It was found that the total amount of nitrogen fixed was greater without boron, but boron may occasionally increase the amount of nitrogen fixed per gm. of sugar consumed. Humus was found to increase markedly the amount of nitrogen fixed, the sugar consumed, and the nitrogen fixed per gm. of sugar consumed. The retardative effect of boron is more marked in the presence of humus.—*C. H. Farr.*

4625. WENHOLZ, H. Some recent views on the liming of soils. Agric. Gaz. New South Wales 34: 7-13. 1923.—It is pointed out that the soils of Australia present unique problems from the standpoint of the use of lime.—*L. R. Waldron.*

4626. ZUNKER, F. *Die Bestimmung der spezifischen Oberfläche des Bodens.* [The determination of the specific surface of the soil.] Landw. Jahrb. 58: 159-205. 1923.—The specific surface is a general measure of the degree of division of a substance. Penetrability of water in the soil, which determines the distance between the drains, is a function of the specific surface. Various formulae are developed for the determination of the specific surface. Practically it is carried out as follows: soil samples (1 kgm.) are taken at a depth of 0.5, 1.0, and 1.5 m., and air dried. The soil in each sample is mixed and larger stones separated out; 300 cc. of distilled H₂O and 30 cc. of normal ammonia solution are added to 200-300 gm. of sandy loams, 100-150 gm. of loams, 50-100 gm. of clays, and 50 gm. of heavy clays taken in parallels, the moisture having been determined. These remain 24 hours, are shaken 2 hours in a rotating apparatus, and after standing a few seconds the suspension is poured off from sediment; more distilled water is added to the latter to free it from finer particles; the sediment is then dried and weighed. The suspension is diluted and specific weight determined by means of a special apparatus. By using a formula ($U = \frac{6.971}{\sqrt{T_o}} \cdot \frac{G\%}{H} \cdot F^1$), the specific surface is obtained. The distance of the drains is then determined from the specific surface of the soil.—S. A. Waksman.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 3779, 3816, 3827, 3978, 3979, 4081, 4092, 4097, 4120, 4128, 4147, 4391)

GENERAL

4627. BLACK, J. M. *Flora of South Australia. Part I. Cyatheaceae-Orchidaceae.* 8 vo, 154 p., 19 pl., 34 fig. R. E. E. Rogers: Adelaide, 1922.—This publication is the first of a series of handbooks of the flora and fauna of South Australia, issued by the British Science Guild (South Australian Branch). The treatment of the Orchidaceae in the present part is contributed by R. S. ROGERS. Following the author's preface are short chapters on the history of botany in South Australia and a glossary of botanical terms. Dichotomous keys lead to the families, genera, and species, and each category is briefly characterized. The geographical range of the species is given and the time of flowering and fruiting of each species is also indicated. The following names are definitely indicated as new combinations: *Leptochloa digitata* (*Eleusine digitata* Spreng.), *Cladium tetragonum* (*Lepidosperma tetragona* Labill.), and *Dichopogon fimbriatus* (*Arthropodium fimbriatum* R. Br.).—J. M. Greenman.

4628. GAMBIER-PARRY, T. [Rev. of: SKENE, MACGREGOR. *Common plants.* 8vo., 271 p. A. Melrose: London and New York.] Rept. Bot. Soc. and Exchange Club British Isles 6: 350. 1921. [1922].—[See also Bot. Absts. 11, Entry 1085.]

4629. HITCHCOCK, A. S. *Remarks on Mr. Sprague's suggestion.* Science 57: 209. 1923.—The author expresses his willingness to accept the compromise suggested by T. A. Sprague [see Bot. Absts. 12, Entry 4634] to harmonize the Type-basis Code and the International Rules of Nomenclature. He also requests that taxonomic botanists submit statements of their views on such a compromise in the hope that all those concerned will be prepared for action at the next International Botanical Congress.—C. J. Lyon.

4630. KNOCHE, HERMAN. *Flora Balearica. Étude phytogéographique sur les Isles Baléares.* [Flora of Balearica. Phytogeographical study of the Balearic Islands.] Vol. II. Roy. 8vo, 585 p. Roumégous and Déhan: Montpellier, 1922.—This volume continues on the same plan as the first one and includes the natural groups from *Laurus* of the Lauraceae to *Scorzonera* of the Compositae. The following new species, names, varieties, and combinations

are included: *Umbilicus vulgaris* L. var. *pendulinus* (*U. pendulinus* DC.), *U. vulgaris* L. var. *gaditanus* (*U. gaditanus* Pau & Pons-Guer.), *Genista acanthoclada* DC. var. *fasciculata*, *Anthyllis Vulneraria* L. var. *balearica* (*A. balearica* Coss.), *Ruta chalepensis* L. var. *bracteosa* (*R. bracteosa* DC.), *Euphorbia Maresii* (*E. Gayi* Mar. & V., not Salis) and var. *balearica* (*E. Gayi* var. *balearica* Willk.) and var. *minoricensis* (*E. Gayi* Porta, not Salis), *Viola odorata* L. var. *alba* (*V. alba* Becker), *Bupleurum frutescens* L. var. *Barceloi* (*B. Barceloi* Cosson), *Pimpinella Tragium* Vill. var. *balearica*, *Adiantum Bicknellii*, *Ligusticum pyrenaicum* Gouan. var. *Huteri* (*L. Huteri* Porta), *Primula acaulis* (L.) var. *alba*, *Statice virgata* Willd. var. *minuta* (*S. minuta* L.), *Teucrium Polium* L. var. *majoricum* (*T. majoricum* Rouy), *Calamintha Nepeta* Savi var. *glandulosa* (*C. glandulosa* Benth.), *Micromeria biflora* Benth. var. *Rodriguezii* (*M. Rodriguezii* Freyn. & Janka), *Thymus Serpyllum* L. var. *Richardii* (*T. Richardii* Pers.), *Verbascum Boerhavi* L. var. *Portae* (*V. Portae* Willk.), *Chaenorrhinum organifolium* Lange var. *formenterea* (*C. Formenterae* Gand.), *C. rubifolium* Willk. & Lange var. *Bianorii*, *Digitalis purpurea* L. subsp. *dubia* (*D. rubia* Rod.), *Sibthorpia balearica* (*S. africana* Bourg. not L.), *Plantago Psyllium* L. var. *dubia*, *Galium rubrum* L. var. *balearicum*, *Cephalaria rigida* (L.) Schrad. var. *balearica*, *Cirsium lanceolatum* (L.) Scop. var. *echinatum* (*C. echinatum* (DC.)), *Centaurea Calcitrapa* L. var. *myacantha* (*C. myacantha* DC.), *C. diana* (*Carduncellus dianius* Webb.), and *Leontodon hirtus* L. var. *hispida* (*Thrincia hispida* Rod.). 1910. Vol IV. 1-47 pl., maps 3-5, and frontispiece. 1923.—This volume contains illustrations of about 50 species and varieties of plants and a number of reproduced photographs showing characteristic views of natural vegetation, particularly on the island of Majorca.—J. M. Greenman.

4631. MIYABE, KINGO, and YUSHUN KUDO. *Icones of the essential forest trees of Hokkaido*. Folio. Fasc. 7, pl. 20-22. May, 1922; fasc. 8, pl. 23-25, Aug., 1922; fasc. 9, pl. 26-28, Feb., 1923. Published by the Hokkaido Government.—The present fascicles contain descriptions and colored illustrations of 9 species of trees including 1 variety, 3 in each fascicle. These are: *Juglans Sieboldiana* Maxim., *Pterocarya rhoifolia* Sieb. & Zucc., and *Carpinus cordata* Bl.; *C. laxiflora* Blume, *Ostrya japonica* Sarg., *Betula Maximowicziana* Rgl.; *B. Ermanii* Cham., *B. japonica* Sieb., and *Alnus japonica* Sieb. & Zucc. var. *arguta* Call. A very full bibliography and synonymy are given in each case.—J. M. Greenman.

4632. PEARSALL, W. H. [Rev. of: Moss, C. E. *The Cambridge British flora*. Vol. III. *Portulacaceae to Fumariaceae*. xvi + 200 p. Cambridge University Press: 1920 (see Bot. Absts. 8, Entry 2232).] Rept. Bot. Soc. and Exchange Club British Isles 6: 75-79. 1920 [1921].—[See also Bot. Absts. 9, Entry 1078; 10, Entry 335.]

4633. SCHAFFNER, JOHN H. *Field manual of trees including southern Canada and northern United States to the southern boundary of Virginia, Kentucky and Missouri, westward to the limits of the prairie*. 2nd ed., small 8vo, 154 p. R. G. Adams & Co.: Columbus, 1922.—The present edition remains substantially the same as the one published in 1914. Certain corrections and a few minor changes only have been made. Two keys to the genera are given; one is based mainly on leaf and twig characters of the plant in the summer condition, the other chiefly on twig and stem characters in the winter condition. Each genus is briefly characterized, and under the larger genera keys to the species are included. Habitat and general geographical distribution are indicated.—J. M. Greenman.

4634. SPRAGUE, T. A. *Suggestions for a world-code of plant nomenclature*. Science 57: 207-208. 1923.—The author proposes a compromise between the Type-basis Code (Science 49: 333. 1919; 53: 312. 1921) and the International Rules of Botanical Nomenclature. Recent discussions in The Journal of Botany (1921 & 1922) have pointed out differences between the 2 codes and the resulting handicaps to systematic botany. Nine definite suggestions are given, and their acceptance is urged by both sides. Such action would involve sacrifices by both sides but would lead to harmony and 1 set of rules for all [See also Bot. Absts. 12, Entry 4629].—C. J. Lyon,

4635. WU, Y. T. [The criterion for classification of plants.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 7: 785-797. 1922. [Text in Chinese.]—A treatise is presented on the general principles in classifying plants.—*Chunjen C. Chen.*

PTERIDOPHYTES

4636. BLATTER, E., and J. F. d'ALMEIDA. The ferns of Bombay. *Small 8vo, viii + 228 p., 15 pl., 42 fig., and frontispiece.* D. B. Taraporevala Sons & Co.: Bombay, 1922.—This work is a popular presentation of the ferns of the Bombay Presidency. A synoptical key to 54 genera is given, as well as keys to the species under the larger genera. *Ophioglossum Aitchisoni* d'Almeida is described and illustrated as new to science. [See also following entry.]—*J. M. Greenman.*

4637. BRITTON, E. G. [Rev. of: BLATTER, E., and J. F. d'ALMEIDA. The ferns of Bombay. viii + 228 p., 15 pl., 42 fig., and frontispiece. D. B. Taraporevala Sons & Co.: Bombay, 1922 (see preceding entry).] *Torreya* 23: 11. 1923.

4638. GRAVES, E. W. An interesting trip. *Amer. Fern Jour.* 11: 86-88. 1921.—The trip was made in May, 1917, to Bucks Pocket, Alabama, to collect specimens of *Trichomanes Petersii* Gray. Eight species of ferns and a number of angiosperms were seen.—*F. C. Anderson.*

4639. HERTER, W. Lycopodiaceae borneenses. [Lycopodiaceae of Borneo.] *Philippine Jour. Sci.* 22: 179-184. 1923.—Twelve species of *Urostachys* and 3 of *Lycopodium* are recognized as occurring in Borneo. The following new combinations, species, and varieties appear: *Urostachys Selago* (*Lycopodium Selago* L.), *U. borneensis*, *U. nummularifolius* (*L. nummularifolium* Blume), *U. Hellwigi* (*L. Hellwigi* Warb.), *U. Lauterbachi* (*L. Lauterbachi* Pritz.), and *Lycopodium cernuum* Linn. vars *typica*, *longiflora*, and *vulcanicum*.—*E. D. Merrill.*

4640. HERTER, W. Lycopodiaceae philippinenses. [Lycopodiaceae of the Philippines.] *Philippine Jour. Sci.* 22: 57-76. 1923.—Two genera, *Urostachys* with 15, and *Lycopodium* with 7 species are recognized. Keys to the genera and species are given. The following are new: *Urostachys minimus*, *U. Whitfordi*, *U. Toppingi*, *U. Merrilli*, *U. Elmeri*, *U. banayanicus*, *U. salviniodes*, and *U. Delbruckii*. By transfer from *Lycopodium* the following new combinations appear: *Urostachys serratus* (Thunb.), *U. verticellatus* (Linn. f.), *U. squarrosus* (Forst.), *U. Magnusianus* (Hert.), *U. carinatus* (Desv.), *U. pinifolius* (Blume), and *U. phlegmaria* (Linn.). The paper closes with a comprehensive consideration of the geographic distribution of the various species.—*E. D. Merrill.*

4641. HUNTER, MABEL R. The present status of *Scolopendrium* in New York state. *Amer. Jour. Bot.* 9: 28-36. 2 fig. 1922.—The 4 stations previously reported for *Scolopendrium vulgare* Sm. in central New York were located and the species found to be still present there. Two new substations were discovered. Evidence is presented through counts of individual plants in 1916 and 1921 that this fern is becoming somewhat more abundant.—*E. W. Sinnott.*

4642. KNOWLTON, C. H., W. S. RIPLEY, JR., and C. A. WEATHERBY. Third report of the Committee on Floral Areas. *Rhodora* 23: 209-220. 1921.—This report covers the Ophioglossaceae, Marsileaceae, Salviniaceae, Equisetaceae, Lycopodiaceae, and Selaginellaceae, and is published as a part of the Preliminary Lists of New England Plants. A table gives the distribution of the plants by states; they are further classified into geographical and ecological groups.—*James P. Poole.*

4643. LEWIS, CHARLES S., and WILLIAM F. LEWIS. A list of ferns found in New Hampshire. *Amer. Fern Jour.* 11: 82-85. 1921.—The list consists of 34 species distributed among 14 genera 10 varieties, and 5 hybrids. The ferns were collected during the summer of 1916, near Melvin Village including Mt. Shaw and near North Woodstock; and during summer, 1918, near Whitefield and the Presidential Range including Mt. Washington.—*F. C. Anderson.*

4644. MARSHALL, M. A. Proliferous ebony spleenwort. Amer. Fern Jour. 13: 7-13. Pl. 1. 1923.—Growing in the basement of Woodstock Academy, Woodstock, Connecticut was found a colony of *Asplenium platyneuron* (L.) Oakes with small plants growing on the stipes of many of the plants.—F. C. Anderson.

4645. MUNZ, PHILIP A., and IVAN M. JOHNSON. The distribution of southern California pteridophytes. Amer. Fern. Jour. 13: 1-7. 1923.—The Selaginellaceae and Equisetaceae are discussed. This is the conclusion of a paper begun earlier [see Bot. Absts. 12, Entry 2858].—F. C. Anderson.

4646. RUGG, HAROLD GODDARD. *Adiantum pedatum* var. *aleuticum* in New England. Amer. Fern Jour. 12: 128-130. Pl. 8. 1922.—The new station recorded for this species is near Montgomery Center, Vermont.—F. C. Anderson.

4647. TILTON, GEORGE H. The fern lover's companion. Pocket size, 240 p, 159 illus. Originally published by the author: Melrose, Massachusetts, 1922 (now in the hands of Little, Brown & Co., Boston).—This is a book for amateurs. A brief account of reproduction in ferns, explanations of some of their characters and of the corresponding descriptive terms, and directions for making herbarium specimens are given, with an illustrated key to the genera. Then follow brief, nontechnical descriptions of the (82) species of Euflicineae and Ophioglossales in the Gray's Manual region, with habitat and range data and miscellaneous information. The English names commonly used are given for all species; the Latin nomenclature follows in the main that the 7th edition of Gray's Manual, with synonymy covering fairly well usage in the U. S. A. back to 1890. Names such as *Pteretis nodulosa*, which have come into use since the publication of the 7th edition are shown in distinctive type. The descriptive part is followed by short biographical sketches of 10 "fern authors," a bibliography, a list of times of fruiting of different species, a glossary of technical terms, and a check-list of the Latin names.—C. A. Weatherby.

4648. WHEELER, LESTON A. *Botrychium obliquum*, var. *dissectum* in Vermont. Amer. Fern Jour. 12: 127-128. 1922.

4649. WHERRY, EDGAR T. Wall ferns in Wilmington, North Carolina. Amer. Fern Jour. 13: 17-18. 1 fig. 1923.—*Pteris multifida* Poiret and *Adiantum Capillus-Veneris* L. were found growing on walls.—F. C. Anderson.

SPERMATOPHYTES

4650. ANONYMOUS. *Feijoa Sellowiana*. Amer. Bot. 29: 13-15. 1923.—The article gives a brief description and illustration of the fruit of the South American *Feijoa Sellowiana*.—Susan P. Nichols.

4651. BAILEY, L. H. Two species of *Hibiscus* from China. Gentes Herbarum 1: 109-110. Fig. 50. 1922.—The new species described are *Hibiscus sinosyriacus* and *H. paramutabilis*.—Alfred Rehder.

4652. BURKILL, I. H., and F. W. FOXWORTHY. Notes on Dipterocarps. No. 6. On the genus *Pachynocarpus*. Jour. Straits Branch Roy. Asiatic Soc. No. 86, p. 271-280. 1922.—The genus *Pachynocarpus* is overgrown and should surrender to *Vatica*; *P. Wallichii* King, *P. ruminatas* Brandis, and *P. Ridleyanus* J. W. Anderson become *V. Wallichii* Dyer, *V. ruminata* Burck, and *V. Ridleyana* Brandis. *Pachynocarpus* is then left with two species, *P. umbonatus* Hook. f., of Borneo, which should be sought for and reexamined, and *P. Stapfianus* King, which occurs in the Malay Peninsula from Lower Siam to Selanger and Pahang. The known distribution of *Vatica Wallichii* is given; and to it *V. obtusifolia* Ridl. and *V. Kelsalli* Ridl. are reduced. Its fruits are distributed by water.—I. H. Burkill.

4653. HŪ, H. H. [The two newly-discovered plants of Chekiang province.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 7: 608-612. Pl. 1-2. 1922. [Text in Chinese.]—*Rubus Hui* and *Mollinia Hui*, among the author's collection of plants in Chekiang, have been identified and determined as new species by Diels and Pilger respectively. Descriptions in Chinese and Latin are appended.—*Chunjen C. Chen.*

4654. HUTCHINSON, J. A contribution to the flora of northern Nigeria. Kew Bull. 1921: 353-407. Fig. 1-10. 1921.—This is an annotated catalogue of plants collected by H. V. Lely on the Bauchi Plateau, a region but little known botanically. The following species are described as new: *Artabotrys nigericus*, *Cissus Lelyi*, *Crotalaria crepitans*, *C. naragutensis*, *Smithia speciosa*, *Vigna longissima*, *Dissotis graminicola*, *D. cinerascens*, *Pycnocycla occidentalis*, *Pentas globifera*, *Vernonia saussureoides*, *Coreopsis camporum*, *Senecio Lelyi*, *Centaurea nigerica*, *Maba secundiflora*, *Margaretta inopinata*, *Ceropegia pedunculata* Turrile, *Peristrophe pilosa*, *Clerodendron Lelyi*, *Acrocephalus albobiridis*, *Protea argyrophaea*, *Eulophia propinqua*, *Satyrium nigericum*, and *Lapeyrouisia montana*.—*T. J. Fitzpatrick.*

4655. MACKENZIE, KENNETH KENT. Notes on *Carex*-XII. Bull. Torrey Bot. Club 49: 361-373. 1922.—*Carex Richii* (Fernald) Mackenzie, *C. cumulata* (Bailey) Mackenzie, and *C. Merritt-Fernaldii* Mackenzie are described as new species. *Carex Longii* Mackenzie is a new name given to the plant which has recently been treated as *C. albolutescens* Schw., the type specimen of the latter having been shown to be a plant of *C. straminea* Schk.—*P. A. Munz.*

4656. MERRILL, ELMER D. New or noteworthy Bornean plants. Jour. Straits Branch Roy. Asiatic Soc. No. 85, p. 151-201. 1922.—The following new genera, species, and combinations are published: *Pandanus sandakanensis*, *P. Matthewsii*, *P. obovatus*, *P. pachyphyllus*, *Mapania sessilis*, *M. affinis*, *M. gracilipes*, *M. heterocephala*, *Schismatoglottis ferruginea*, *Pleomele borneensis*, *Smilax gigantea*, *S. Woodii*, *Curculigo borneensis*, *Phrynium inflatum*, *Artocarpus Clementis*, *A. borneensis*, *A. peltata*, *Laportea oblanceolata*, *Fissipetalum* n. gen. (Olacaceae), *F. borneense*, *Jussiaea* n. gen. (Menispermaceae), *J. borneensis*, *Tinospora glandulosa*, *Cyclea caudata*, *Talauma megalophylla*, *T. borneensis*, *Artabotrys Clementis*, *A. borneensis*, *A. trichopetalus*, *A. trigyna*, *Fissistigma Clementis*, *Oxymitra grandifolia*, *O. acuminata*, *Goniothalamus stenophyllus*, *G. nitidus*, *G. dolichocarpus*, *Polyalthia tenuipes*, *P. xanthopetala*, *Phaeanthus impressinerviis*, *Woodiella* n. gen. (Anonaceae), *W. sympetala*, *Knema Winkleri*, *K. oblongata*, *K. nitida*, *Actinodaphne diversifolia*, *Litsea cuprea*, *L. caulocarpa*, *L. sandakanensis*, *L. megalophylla*, *L. elliptica*, *Agelaea Agamae*, *A. sarawakensis*, *A. Woodii*, and *Connarus euphlebius*.

The following old species are added to the flora of Borneo: *Themeda frondosa* Merr., *Panicum carinatum* Presl, *P. distachyum* Linn., *Dincholea pubiramea* Gamble, *Cyperus procerus* Rottb., *Forrestia glabrata* Hassk., *Curculigo glabrescens* (*C. latifolia* Dry. var. *glabrescens* Ridl.), *Dioscorea flabellifolia* Prain & Burkill, *Phacelophrymum bracteosum* K. Schum., *Helicia excelsa* Blume, *Viscum angulatum* Heyne, *Polyalthia dolichophylla* Merr., *P. subcordata* Blume, *P. lateriflora* (Blume) King, *Popovia velutina* King, *Uvaria micrantha* (DC.) Hook. f., *Litsea grandis* (Wall.) Hook. f., *L. megacarpa* Gamble, *L. bancana* (Miq.) Boerl., *L. odorifera* Valetton, *Dehaasia triandra* Merr., *Lindera malaccensis* Hook. f., *Illigera celebica* Miq., *Polyosma integrifolia* Blume, and *Cnestis palata* (*Thysanus palata* Lour.).—*I. H. Burkill.*

4657. MERRILL, ELMER D. New or noteworthy Bornean plants. Part II. Jour. Straits Branch Roy. Asiatic Soc. No. 86, p. 312-342. 1922.—Descriptions of the following new species are published: *Derris pachycarpa*, *Canavalia bracteolata*, *Sarcotheca pinnata*, *Erodia punctata*, *Chisochiton brachyanthum*, *C. kinabaluensis*, *Aglais baramensis*, *Glochidion lancispalum*, *Galearia stenophylla*, *G. sessiliflora*, *Melanochyla ferruginea*, *Semecarpus borneensis*, *S. oblanceolata*, *Salacia nitidissima*, *Phytocrene anomala*, *Elaeocarpus brevipes*, *Grewia pyriformis*, *Sterculia trichopetiolata*, *Saurauia amplifolia*, *Gordonia grandiflora*, *Taraktogenos grandiflora*, *Casearia borneensis*, *Begonia angustilimba*, *Eugenia sandakanensis*, *E. Woodii*, *Myrtus Moul-*

tonii, *Melastoma laevifolium*, *Dalenia pubescens*, *Dissochaeta Ramosii*, *Kibessia verrucosa*, and *Alangium borneense*. The names *Actinidia latifolia* and *Gordonia amboinensis* are proposed for *Actinidia Champoioni* Benth. and *Laplacea amboinensis* Miq., respectively, and the first is added to the list of known Bornean plants. The following are also added to the list: *Erodia binloca* Blanco, *Aphanamixis sumatrana* Harms, *Santiria samarensis* Merr., *Canarium pseudo-commune* Hochr., *Dichapetalum holopetalum* Merr., *Homonoia javensis* Muell. Arg., *Mallotus Blumeanus* Muell. Arg., *M. Moritzianus* Muell. Arg., *Actephila dispersa* Merr., *Cleistanthus megacarpus* C. B. Rob., *Omphalea bracteata* (Blanco) Merr., *Salacia oblongifolia* Blume, *Iodes philippinensis* Merr., *Neesia syndandra* Mast., *Boschia Griffithii* Mast., *Linostoma pauciflorum* Griff., *Eugenia palawanensis* C. B. Rob., *Clidemia hirta* (Linn.) D. Don, and *Pachycentria constricta* Blume.—I. H. Burkill.

4658. MUNZ, PHILIP A., and IVAN M. JOHNSTON. Miscellaneous notes on plants of southern California—II. Bull. Torrey Bot. Club 49: 349-359. 1922.—Species new to southern California and extensions of range for others are mentioned. The following nomenclatorial changes and additions are made: *Phoradendron californicum* var. *distans* f. *leucocarpum* Trelease f. nov., *Eriogonum nodosum* var. *Jaegeri* var. nov., *Eriogonum fasciculatum* var. *flavoviride* var. nov., *Scopulophila Rixfordii* (Brandege) comb. nov., *Claytonia lanceolata* var. *Peirsonii* var. nov., *Draba corrugata* var. *saxosa* (Davidson) comb. nov., *Sphaeralcea rosacea* sp. nov., *Oenothera cardiophylla* var. *splendens* var. nov., *Asclepias eriocarpa* var. *microcarpa* var. nov., *Phlox bernardina* sp. nov., *Penstemon Clevelandi* var. *connatus* var. nov., *Galium angustifolium* var. *pinetorum* var. nov., and *G. Hallii* sp. nov.—P. A. Munz.

4659. PENNELL, FRANCIS W. Some overlooked Scrophulariaceae of Rafinesque. Torreya 22: 77-84. 1922.—The author's review of the Scrophulariaceae [see Bot. Absts. 3, Entry 3013; 5, 2392, 2393, 2393; 6, 436] is supplemented by a list of names published by Rafinesque in works so rare that they have not yet been catalogued. Twenty-seven species and varieties from the Autikon Botanikon and one from the American Monthly Magazine are listed and referred to their modern equivalents. Two new combinations are published: *Mecardonia acuminata* (Walt.) Small var. *microphylla* (Raf.) Pennell, and *Scrophularia lanceolata* Pursh var. *occidentalis* (Rydb.) Pennell.—J. C. Nelson.

4660. RIDLEY, H. N. New and rare Malayan plants. Series XII. Jour. Straits Branch Roy. Asiatic Soc. No. 86 pp. 292-311. 1922.—The following new species and varieties are described: *Turraea breviflora*, *Zizyphus pernettoides*, *Eugenia alata*, *Trevesia rufo-setosa*, *Turraea calcarea*, *Pavetta graciliflora* Wall., *P. pauciflora*, *Psychotria lanceolaria*, *P. atroviridis*, *Cephaelis melanocarpa*, *Borreria pilulifera*, *B. parviceps*, *Embelia subcordata*, *Ervatamia pauciflora*, *E. pauciflora* var. *minor*, *Hoya citrina*, *Cynanchum Seimundii*, *Gaertnera ovata*, *G. rigida*, *Didissandra castaneaefolia*, *Didymocarpus castaneaefolia*, *Loxocarpus minimus*, *Cyrtandra patula*, *Ebermaiera longispica*, *Strobilanthes latebrosa*, *S. leucopogon*, *Barleria siamensis* Craib var. *glabrescens*, *Gymnostachyum Robinsonii*, *Eranthemum candidum*, *Justicia Robinsonii*, *J. microcarpa*, *Sphinctacanthus malayanus*, *Elytranthe tubaeiflora*, *Ficus patens*, *Elatostemma inaequilobum*, *Thrixspermum iodochilus*, *Neuwiedia ocrea*, *Alpinia campanaria*, *A. Seimundii*, *Amomum spicatum*, *Amorphophallus elegans*, *Pothosa lorispatha*, *Areca latiloba*, *Pinanga glaucescens* and *Pandanus pilaris*. The following new combinations appear: *Pavetta indica* var. *canescens* (*P. canescens* Wall.), *Borreria laevicaulis* (*Bigelovia laevicaulis* Miq.), *B. setidens* (*Bigelovia setidens* Miq.), and *Kampferia cyanescens* (*Elettariopsis cyanescens* Ridl.). The following are recorded as occurring in the Malay Peninsula: *Polygala pulchra* Hassk., *Pavetta tomentosa* Roxb., *P. graciliflora* Wall., *Borreria latifolia* K. Schum., and *B. hispida*, K. Schum. Lastly there is a note upon the occurrence inland of *Ipomoea Pes-caprae* Roth.—I. H. Burkill.

4661. ROSE, J. N. Byrnesia Weinbergii. Addisonia 7: 37, 38. Pl. 243 (col.). 1922.—This ornamental Crassulaceous herb, recently introduced is made the type of a new genus *Byrnesia*, which is here proposed. The plant is probably Mexican.—T. J. Fitzpatrick.

4662. ROSE, J. N. *Eucrosia Morleyana*. *Addisonia* 7: 3, 4. *Pl.* 226 (col.). 1922.—This herb of the Amaryllidaceae is here described as new. The type locality is Huigra, Ecuador, altitude 4,000 feet.—*T. J. Fitzpatrick*.

4663. ROSE, J. N. *Graptopetalum pachyphyllum*. *Addisonia* 7: 45, 46. *Pl.* 247 (col.). 1922.—This Crassulaceous species, here described as new, was discovered in 1905 in Querétaro, Mexico.—*T. J. Fitzpatrick*.

4664. ROSE, J. N. *Runyonia longiflora*. *Addisonia* 7: 39, 40. *Pl.* 244 (colored). 1922.—*Runyonia* (Amaryllidaceae) gen. nov. and *R. longiflora* sp. nov. are described as new. This plant, from southeastern Texas and northern Mexico, was discovered by Arthur Schott in 1853 and sent to the Torrey herbarium; it was rediscovered by Robert Runyon in 1921.—*T. J. Fitzpatrick*.

REVISIONS AND MONOGRAPHS

4665. BRITTON, N. L., and J. N. ROSE. *The Cactaceae, descriptions and illustrations of plants of the Cactus family*. Vol. III. Carnegie Inst. Washington Publ. 248. 23 + 29 cm., vii + 255 p., 24 pl. (19 colored), 250 fig. Oct. 12, 1922.—The subtribes *Echinocereanae*, *Echinocactanae* and *Cactanae*, of the tribe *Cereeae*, are treated in this volume. Thirty-six genera and 306 species are recognized and are described with complete bibliography, type locality, distribution, and list of previously published illustrations. There are 21 new genera, as follows: *Austrocactus*, *Chamaecereus*, *Lobivia*, *Denmoza*, *Copiapoa*, *Toumeya*, *Epithelantha*, *Neoporteria*, *Arequipa*, *Oroya*, *Matucana*, *Hamatocactus*, *Strombocactus*, *Ferocactus*, *Echinomastus*, *Homalocephala*, *Hickenia*, *Frailea*, *Mila*, *Sclerocactus*, and *Utahia*. There are 36 new species, as follows: *Echinocereus grandis*, *E. Standleyi*, *E. perbellus*, *E. Fitchii*, *E. scopulorum*, *E. Palmeri*, *E. Lloydii*, *E. sarissophorus*, *E. Barthelowanus*, *Lobivia Bruchii*, *L. ferox*, *L. longispina*, *L. boliviensis*, *L. Shaferi*, *L. pampana*, *L. grandiflora*, *L. grandis*, *Echinopsis Spegazziniana*, *E. Shaferi*, *E. aurea*, *Copiapoa megarhiza*, *Echinofossulocactus Lloydii*, *E. zacatecasensis*, *E. confusus*, *Ferocactus Townsendianus*, *F. horridus*, *F. santa-maria*, *F. Corillei*, *F. Rostii*, *Mila caespitosa*, *Discocactus subnudus*, *D. Zehntneri*, *D. bahiensis*, *Cactus Broadwayi*, *C. bahiensis*, and *C. Zehntneri*. There are 2 new names as follows: *Gymnocalycium Spegazzinii* and *Cactus Townsendii*. There are 156 new combinations with name-carrying synonyms in parentheses, as follows: *Echinocereus pacificus* (*Cereus phoeniceus pacificus* Engelm.), *E. octacanthus* (*Echinopsis octacantha* Mühlenpfordt), *E. sciurus* (*Cereus sciurus* Brandg.), *E. mamillatus* (*Cereus mamillatus* Engelm.), *Austrocactus Bertinii* (*Cereus Bertini* Cels), *Rebutia pseudominuscula* (*Echinopsis pseudominuscula* Speg.), *R. pygmaea* (*Echinopsis pygmaea* Fries), *R. Steinmannii* (*Echinocactus Steinmannii* Solms-Laubach), *Chamaecereus Silvestrii* (*Cereus Silvestrii* Speg.), *Lobivia cachensis* (*Echinopsis cachensis* Speg.), *L. caespitosa* (*Echinopsis caespitosa* Purpus), *L. saltensis* (*Echinopsis saltensis* Speg.), *L. cinnabarina* (*Echinocactus cinnabarius* Hooker), *L. Pentlandii* (*Echinocactus Pentlandii* Hooker), *L. lateritia* (*Echinopsis lateritia* Gürke), *L. corbula* (*Mammillaria corbula* Herrera), *L. andalgalensis* (*Cereus andalgalensis* Weber), *L. haematantha* (*Echinocactus haematanthus* Speg.), *L. thionanthus* (*Echinocactus thionanthus* Speg.), *L. chionanthus* (*Echinocactus chionanthus* Speg.), *L. Cumingii* (*Echinocactus Cumingii* Hopffer), *Denmoza rhodacantha* (*Echinocactus rhodacanthus* Salm-Dyck), *Copiapoa cinerea* (*Echinocactus cinereus* Philippi), *C. marginata* (*Echinocactus marginatus* Salm-Dyck), *C. coquimbana* (*Echinocactus coquimbanus* Karwinsky), *C. cinerascens* (*Echinocactus cinerascens* Salm-Dyck), *C. echinoides* (*Echinocactus echinoides* Lemaire), *Toumeya papyracantha* (*Mammillaria papyracantha* Engelm.), *Epithelantha micromeris* (*Mammillaria micromeris* Engelm.), *Neoporteria nidus* (*Echinocactus nidus* Söhrens), *N. occulta* (*Echinocactus occultus* Philippi), *N. nigricans* (*Echinopsis nigricans* Linke), *N. Jussieui* (*Echinocactus Jussieui* Monville), *N. subgibbosa* (*Echinocactus subgibbosus* Haworth), *N. chilensis* (*Echinocactus chilensis* Hildmann), *N. fusca* (*Echinocactus fuscus* Mühlenpfordt), *Arequipa leucotricha* (*Echinocactus leucotrichus* Philippi), *A. myriacantha* (*Echinocactus myriacanthus* Vaupel), *Oroya peruwiana* (*Echinocactus peruvianus* Schumann), *Matucana Haynei* (*Echinocactus Haynii* Otto), *Hamatocactus setispinus* (*Echinocactus setispinus* Engelm.), *Strombocactus disciformis*

(*Mamillaria disciformis* DC.), *Echinofossulocactus hastatus* (*Echinocactus hastatus* Hopffer), *E. multicostatus* (*Echinocactus multicostatus* Hildmann), *E. Wippermannii* (*Echinocactus Wippermannii* Mühlenpfordt), *E. heteracanthus* (*Echinocactus heteracanthus* Mühlenpfordt), *E. albatu*s (*Echinocactus albatu*s Dietrich), *E. lamellosus* (*Echinocactus lamellosus* Dietrich), *E. grandicornis* (*Echinocactus grandicornis* Lemaire), *E. arrigens* (*Echinocactus arrigens* Link), *E. violaciflorus* (*Echinocactus violaciflorus* Quehl), *E. pentacanthus* (*Echinocactus pentacanthus* Lemaire), *E. dichroacanthus* (*Echinocactus dichroacanthus* Martius), *E. tricuspidatus* (*Echinocactus tricuspidatus* Scheidweiler), *E. lancifer* (*Echinocactus lancifer* Dietrich), *Ferocactus Stainesii* (*Echinocactus Stainesii* Hooker), *F. Pringlei* (*Echinocactus pilosus* Pringlei Coulter), *F. Fordii* (*Echinocactus Fordii* Orcutt), *F. chrysacanthus* (*Echinocactus chrysacanthus* Orcutt), *F. Wislizeni* (*Echinocactus Wislizeni* Engelm.), *F. Lecontei* (*Echinocactus Lecontei* Engelm.), *F. acanthodes* (*Echinocactus acanthodes* Lemaire), *F. Diguettii* (*Echinocactus Diguettii* Weber), *F. peninsulæ* (*Echinocactus peninsulæ* Weber), *F. rectispinus* (*Echinocactus Emoryi rectispinus* Engelm.), *F. Orcuttii* (*Echinocactus Orcuttii* Engelm.), *F. robustus* (*Echinocactus robustus* Link & Otto), *F. echidne* (*Echinocactus echidne* DC.) *F. alamosanus* Britton & Rose (*Echinocactus alamosanus* Britton & Rose), *F. glaucescens* (*Echinocactus glaucescens* DC.), *F. flavovirens* (*Echinocactus flavovirens* Scheidweiler), *F. melocactiformis* (*Echinocactus melocactiformis* DC.), *F. macrodiscus* (*Echinocactus macrodiscus* Martius), *F. viridescens* (*Echinocactus viridescens* Torrey & Gray), *F. Johnsonii* (*Echinocactus Johnsonii* Parry), *F. nobilis* (*Cactus nobilis* L.), *F. latispinus* (*Cactus latispinus* Haworth), *F. crassihamatus* (*Echinocactus crassihamatus* Weber), *F. uncinatus* (*Echinocactus uncinatus* Galeotti), *F. hamatacanthus* (*Echinocactus hamatacanthus* Mühlenpfordt), *Echinomastus erectocentrus* (*Echinocactus erectocentrus* Coulter), *E. intertextus* (*Echinocactus intertextus* Engelm.), *E. dasyacanthus* (*Echinocactus intertextus dasyacanthus* Engelm.), *E. unguispinus* (*Echinocactus unguispinus* Engelm.), *E. Macdowellii* (*Echinocactus Macdowellii* Rebut), *E. durangensis* (*Echinocactus durangensis* Rünge), *Gymnocalycium Mihanovichii* (*Echinocactus Mihanovichii* Frië & Gürke), *G. Netrelianum* (*Echinocactus Netrelianum* Monville), *G. Leeaunum* (*Echinocactus Leeaunum* Hook.), *G. Guerkeanum* (*Echinocactus Guerkeanus* Heese), *G. hyptiacanthum* (*Echinocactus hyptiacanthus* Lemaire), *G. saglione* (*Echinocactus saglionis* Cels), *G. brachyanthum* (*Echinocactus brachyanthum* Gürke), *G. Anisitsii* (*Echinocactus Anisitsii* Schumann), *G. Monvillei* (*Echinocactus Monvillei* Lemaire), *G. melanocarpum* (*Echinocactus melanocarpus* Arechavaleta), *G. uruguayense* (*Echinocactus uruguayensis* Arechavaleta), *G. megalothelos* (*Echinocactus megalothelos* Sencke), *G. Kurtzianum* (*Echinocactus Kurtzianum* Gürke), *G. Damsii* (*Echinocactus Damsii* Schumann), *G. platense* (*Echinocactus platensis* Speg.), *G. Schickendantzii* (*Echinocactus Schickendantzii* Weber), *G. Stuckertii* (*Echinocactus Stuckertii* Speg.), *G. Joossensianum* (*Echinocactus Joossensianus* Bödeker), *Homalocephala texensis* (*Echinocactus texensis* Hopffer), *Astrophytum capricorne* (*Echinocactus capricornis* Dietrich), *A. ornatum* (*Echinocactus ornatu*s DC.), *Eriosyce ceratistes* (*Echinocactus ceratistes* Otto), *Malacocarpus Schumannianus* (*Echinocactus Schumannianus* Nicolai), *M. Grossei* (*Echinocactus Grossei* Schumann), *M. nigrispinus* (*Echinocactus nigrispinus* Schumann), *M. Reichei* (*Echinocactus Reichei* Schumann), *M. napinus* (*Echinocactus napinus* Philippi), *M. apricus* (*Echinocactus apricus* Arechavaleta), *M. concinnus* (*Echinocactus concinnus* Monville), *M. tabularis* (*Echinocactus concinnus tabularis* Cels), *M. Scopa* (*Cactus Scopa* Sprengel), *M. pulcherrimus* (*Echinocactus pulcherrimus* Arechavaleta), *M. muricatus* (*Echinocactus muricatus* Otto), *M. Linkii* (*Cactus Linkii* Lehmann), *M. Ottonis* (*Cactus Ottonis* Lehmann), *M. catamarcensis* (*Echinocactus catamarcensis* Speg.), *M. patagonicus* (*Echinocactus patagonicus* Weber), *M. Langsdorffii* (*Cactus Langsdorffii* Lehmann), *M. mammulosus* (*Echinocactus mammulosus* Lemaire), *M. islayensis* (*Echinocactus islayensis* Forster), *M. Strausianus* (*Echinocactus Strausianus* Schumann), *M. Haselbergii* (*Echinocactus Haselbergii* Haage), *M. Maassii* (*Echinocactus Maassii* Heese), *M. tuberculatus* (*Echinocactus tuberculatus* Jacobi), *M. curvispinus* (*Cactus curvispinus* Bertero), *M. mammillarioides* (*Echinocactus mammillarioides* Hooker), *M. Leninghausii* (*Pilocereus Leninghausii* Haage jr.), *M. Graessneri* (*Echinocactus Graessneri* Schumann), *M. escayachensis* (*Echinocactus escayachensis* Vaupel), *Hickenia microsperma* (*Echinocactus microspermus* Weber), *Frailea gracillima* (*Echinocactus gracillimus* Monville), *F. Grahliana* (*Echinocactus Grahlianus* Haage jr.), *F. pumila* (*Echinocactus pumilus* Lemaire), *F. Schilinzkyana* (*Echinocactus Schilinzkyanus*

Haage jr.,) *F. cataphracta* (*Echinocactus cataphractus* Dams), *F. pygmaea* (*Echinocactus pygmaeus* Speg.), *F. caespitosa* (*Echinocactus caespitosus* Speg.), *F. Knippeliana* (*Echinocactus Knippelianus* Quehl), *Sclerocactus Whipplei* (*Echinocactus Whipplei* Engelm.), *F. polyancistrus* (*Echinocactus polyancistrus* Engelm. & Bigelow) *Utahia Sileri* (*Echinocactus Sileri* Engelm.), *Discocactus Hartmannii* (*Echinocactus Hartmannii* Schumann), *D. heptacanthus* (*Malacocarpus heptacanthus* Rodrigues), *Cactus Lemairei* (*Echinocactus Lemariii* Monville), *C. oreas* (*Melocactus oreas* Miquel), *C. Ruestii* (*Melocactus Ruestii* Schumann), *C. salvador* (*Melocactus salvador* Murillo), *C. obtusipetalus* (*Melocactus obtusipetalus* Lemaire), and *C. Neryi* (*Melocactus Neryi* Schumann). [See also Bot. Absts. 3, Entry 1824; 7, Entry 2194; 12, Entry 4667.]—*J. N. Rose.*

4666. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. VI. Part 6. *P. 255-340, pl. 228-231.* John Spence: Sydney. September, 1922.—The present part contains descriptions and illustrations of the following Australian species: *Eucalyptus Jensenii* n. sp., *E. umbrawarrensis* n. sp., *E. leptophylla* F. v. M., *E. uncinata* Turez., *E. angusta* n. sp., *E. marginata* Sm., *E. buprestium* F. v. M., *E. Bosistoana* F. v. M., *E. altior* (*E. Luehmanniana* F. v. M. var. *altior* Deane & Maiden), *E. conglobata* (*E. dumosa* A. Cunn. var. *conglobata* (R. Br.) Benth.), *E. angulosa* Schauer, and *E. Johnstoni* n. sp. A chapter is added in which the author presents a general discussion on the leaf of *Eucalyptus*.—*J. M. Greenman.*

4667. TAYLOR, NORMAN. [Rev. of: BRITTON, NATHANIEL L., and J. N. ROSE. *The Cactaceae, descriptions and illustrations of plants of the Cactus family*. Vol. III. Carnegie Inst. Washington Publ. 248. 1922 (see Bot. Absts. 12, Entry 4665).] *Science* 57: 272-273. 1923.

4668. WILLIAMSON, H. B. A revision of the genus *Pultenaea*, Part II. *Proc. Roy. Soc. Victoria* 33: 133-148. *Pl. 6-7.* 1921.—This revision covers 34 species, including 4 new varieties and 4 new species, as follows: *Pultenaea humilis* Benth. var. *glabrescens*, *P. juniperina* Labitt. var. *planifolia*, *P. acerosa* R. Br. var. *acicularis*, *P. laxiflora* Benth. var. *pilosa*, *P. radiata*, *P. costata*, *B. recurvifolia*, and *P. divaricata*. One new combination, *P. ferruginia* Rudge var. *Deanei* (*P. Deanei* R. T. Baker) is made.—*Eloise Gerry.*

FLORISTICS AND PLANT DISTRIBUTION

4669. BENNETT, ARTHUR. *Pyrola rotundifolia* Linn. in Caithness, with notes on the genus. *Trans. and Proc. Bot. Soc. Edinburgh* 28: 71-75. 1921.—The distribution of this and allied species in Scotland is discussed.—*Roxana Stinchfield Ferris.*

4670. CHUN, WOON YOUNG. [Chinese pines compared with the Japanese pines cultivated in China.] *Ko-Hsueh [Science-Publ. Chinese Sci. Soc.]* 7: 379-384. 1922. [Text in Chinese.]—The author gives an analytical key to 2 groups of pines: *Haploxylon* and *Diploxylon*. The following species are given detailed descriptions: *Pinus Massoniana* D. Don, *P. Armandi* Franch., *P. Bungeana* Zucc., *P. sinensis* Lamb., and *P. densiflora* Sieb. & Zucc. of Chinese pines and *P. Thunbergii* Parl., *P. koraiensis* Sieb. & Zucc., and *P. parviflora* Sieb. & Zucc. of Japanese pines.—*Chunjen C. Chen.*

4671. CHURCHILL, J. R. *Cimicifuga racemosa* in Massachusetts. *Rhodora* 23: 201-203. *Pl. 132.* 1921.—Two colonies of *Cimicifuga racemosa* (L.) Nutt. near Sheffield, Berkshire County, are described; a photograph illustrates the extent of 1 colony. This species has rarely, if ever, been found indigenous in New England north of Connecticut.—*James P. Poole.*

4672. COCKERELL, T. D. A. Flora of Porto Santo. *Torreya* 22: 4-10. *Fig. 1, 2.* 1922.—This island of the Madeiras is between 6 and 7 miles long and 3 miles across, reaching an altitude of 1,660 feet. The surface is rough and rocky, and the vegetation xerophytic. There are recorded 315 terrestrial vascular plants not in cultivation, to which the author adds

Adonis microcarpa DC.; only 7 of these are endemic. At least 160 species are introduced. The 3 Desertas islands, in plain sight from Porto Santo, have 138 species of vascular plants, with 2 endemic.—J. C. Nelson.

4673. DEAM, CHAS. C. *Trees of Indiana*. 1st rev. ed. 17 × 26 cm., 317 p., 137 pl. Dept. Conservation State of Indiana: 1921.—Descriptions, and photographic illustrations from herbarium specimens, are given of the trees occurring naturally in Indiana. There are described 178 species and 29 varieties. Twenty-three species included in previous lists, are excluded because of the lack of sufficient evidence of their occurrence in the state. Measurements are given of some of the largest trees of common species that have been found in Indiana.—Truman G. Yunker.

4674. DENSLOW, H. M. *An intensive local study in Rhode Island*. *Torreyia* 23: 9-10. 1923.—Albert E. Lownes has intensively studied a square mile of terrain near Providence. *Habenaria hyperborea* (L.) R. Br. is new to Rhode Island. A hybrid *Spiranthes* was critically observed, apparently *S. cernua* × *gracilis*.—J. C. Nelson.

4675. DIELS, L. *Die Theaceen Mikronesiens*. [The Theaceae of Micronesia.] *Bot. Jahrb.* 56: 526. 1921.—This is No. 13 of the series: Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. *Eurya japonica* Thunb. and *E. japonica* Thunb. var. *nitida* Korth. are listed for this region.—K. M. Wiegand.

4676. DIELS, L. [List of determinations of plants collected in Chekiang.] Ko-Hsueh [Science-Pub. Chinese Sci. Soc.] 7: 705-706. 1922. [Text in Chinese.]—The author presents a list of 61 plants collected in the province of Chekiang and determined with botanical names.—Chunjen C. Chen.

4677. EHLERS, J. H. *Panicum virgatum* var. *cubense* in Michigan. *Rhodora* 23: 200. 1921.—An abundant and vigorous growth of this variety was found in 1 locality in Cheboygan County. The species, *P. virgatum* L., has been reported previously in Michigan.—James P. Poole.

4678. FERNALD, M. L. *The Gray Herbarium expedition to Nova Scotia*. 1920. Part II. Noteworthy vascular plants collected in Nova Scotia, 1920. *Rhodora* 23: 184-195, 223-245, 257-278, 284-300. 1921.—Part II contains an enumeration, with notes on their occurrence and critical discussions, of several hundred species, 110 of them new to the flora of Canada, 232 new to Nova Scotia. The newly described or renamed plants are: *Thelypteris palustris* f. *suaveolens* (Clute) n. comb., *Botrychium dissectum* f. *obliquum* (Muhl.) n. comb., *Panicum longifolium* var. *tusketense* n. var., *P. depauperatum* var. *psilophyllum* and f. *cryptostachys* n. var. and n. f., *P. linearifolium* var. *Wernerii* (Scribn.) n. comb., *P. Lindheimeri* var. *septentrionale* n. var. var. *fasciculatum* (Torr.) n. comb., var. *implicatum* (Scribn.) n. comb., *Agrostis hyemalis* var. *elata* (Pursh) n. comb., *Glyceria grandis* f. *pallescens* n. f., *Agropyron pungens* var. *acadiense* (Hubbard) n. comb., *Eleocharis tuberculosa* var. *pubnicoensis* n. var., *Scirpus acutus* f. *congestus* (Farwell) n. comb., *S. atrovirens* var. *georgianus* (Harper) n. comb., *Eriophorum* (Hamissonis) f. *albidum* (F. Nylander) n. comb., *Codium mariscoides* f. *congestum* n. f., *Carex scoparia* f. *peracuta* n. f., *C. albulutescens* var. *cumulata* × *scoparia* n. hybr., *Juncus effusus* var. *costulatus* n. var., *J. canadensis* var. *sparsiflorus* n. var., *J. subcaudatus* var. *planisepalus* n. var., *Lophiola septentrionalis* n. sp., *Habenaria flava* var. *virescens* (Muhl.) n. comb., *Pogonia ophioglossoides* var. *brachypogon* n. var., *Calopogon pulchellus* f. *albiflorus* (Britton) n. comb., *Polygonum robustius* (Small) n. comb., *P. hydropiperoides* var. *digitatum* n. var., *Drosera longifolia* × *rotundifolia* n. hybr., *Pyrus dumosa* (Greene) n. comb., *Amelanchier stolonifera* var. *lucida* n. var., *A. laevis* var. *nitida* (Wiegand) n. comb., *Rubus glandicaulis* var. *neoscoticus* n. var., *Ilex verticillata* var. *fastigiata* (Bicknell) n. comb., *Viola eriocarpa* var. *leiocarpa* Fernald & Wiegand n. var., *Bartonia paniculata* var. *intermedia* n. var., var. *sabulonensis* (Fernald) n. comb., var. *iodandra* (Robinson) n. comb., *Asclepias incarnata* var. *neoscotia* n. var., *Mertensia*

maritiana f. *albiflora* n. f., *Lycopus uniflorus* f. *flagellaris* n. f., *Linaria vulgaris* f. *leucantha* n. f., *Agalinis neoscotica* (Greene) n. comb., *Utricularia subulata* f. *cleistogama* (Gray) n. comb., *Solidago unilugulata* var. *terrae-novae* (T. & G.) n. comb., var. *neglecta* (T. & G.) n. comb., *S. tenuifolia* var. *pycnocephala* n. var., *Antennaria appendiculata* n. sp., *A. neodioica* var. *chlorophylla* n. var., *A. petaloidea* var. *noveboracensis* n. var., *Bidens connata* var. *inundata* n. var., *Senecio pauperculus* var. *Balsamitae* (Muhl.) n. comb., *Prenanthes altissima* f. *hispidula* (Fernald) n. comb.—*M. L. Fernald.*

4679. GARDNER, H. M. Note on the occurrence of *Podocarpus* trees near Nairobi. Jour. East Africa and Uganda Nat. Hist. Soc. No. 18. P. 36-37. 1923.—Record is made of a group of about 25 trees, apparently *Podocarpus gracilior*, found near Nairobi. One tree seems as much as 150 years old, and there are many seedlings. No other colony is known within 100 miles.—*Wm. Randolph Taylor.*

4680. GRAY, FRED W. Scores of stations for *Gaylussacia brachycera* in West Virginia. *Torreyia* 22: 17-18. 1922.—*Gaylussacia brachycera* (Michx.) Gray, the box huckleberry, previously found at only 3 stations in the eastern U. S. A., has been reported from about 75 stations in West Virginia and Virginia. About 40 of these in 3 counties of West Virginia were confirmed by the writer during the summer of 1921. The common name for the plant in this region is Juniper Berry.—*J. C. Nelson.*

4681. GRIMES, E. JEROME. A new station for *Pogonia affinis*. *Rhodora* 23: 195-197. 1921.—A brief description is given of the location, topography, vegetation, and soil character at this station near Williamsburg, Virginia. Descriptions and measurements are given for the 15 plants found.—*James P. Poole.*

4682. HARDY, M. E. Flora of the Michigan sand dunes. *Amer. Bot.* 28: 6-9. 1922.

4683. HIERN, W. P. Tenth report of the botany committee. *Trans. Devonshire Assoc. Adv. Sci. Lit. and Art.* 50: 219-227. 1918.—Local lists of plants from the 8 botanical districts of Devonshire are given, the lists including not only vascular plants but also bryophytes, algae, and fungi. The longest lists are from the Barnstable and Torquay Districts, with 62 and 48 species, respectively. At the close of the report the editor reviews a paper by G. T. HARRIS on the Desmid Flora of Dartmoor, published in 1917.—*A. W. Evans.*

4684. HOLLICK, ARTHUR. Local flora notes—Staten Island. *Torreyia* 22: 1-3. 1922.—Many native species in this area have disappeared because of the growth of the community, and an equal number of alien species have been added. Two areas are of special interest (1) the Todt Hill area, an unglaciated ridge with a characteristic native flora. Ten introduced species rare or wanting elsewhere on the island are recorded. (2) The vicinity of Arlington station, made up of waste material. Of 16 introduced species found here in 1908, only 4 remained in 1921. Six species new to the flora of the island were noticed. The mass of the vegetation, made up of introduced weeds, seems permanently established.—*J. C. Nelson.*

4685. JOHNSTON, H. H. Additions to the flora of Orkney as recorded in Watson's "Topographical Botany," second edition (1883). *Trans. and Proc. Bot. Soc. Edinburgh* 28: 51-66. 1921.—This is the 3rd of a series of papers reporting additions to the flowering plants and cryptogams of Orkney.—*Roxana Stinchfield Ferris.*

4686. LAUTERBACH, C. Die Simarubaceen Mikronesiens. [The Simarubaceae of Micronesia.] *Bot. Jahrb.* 56: 513-514. 1921.—This is no. 8 of the series: Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. DIELS. Only 3 genera, monotypic in that region, are known from these islands. The species are inhabitants of the coastal region, only 1 extending up the rivers. Those listed are: *Suriana maritima* L., *Samadera indica* Gaertn., and *Soulamea amara* Lam.—*K. M. Wiegand.*

4687. LAUTERBACH, C. *Die Rhamnaceen Mikronesiens*. [The Rhamnaceae of Micronesia.] Bot. Jahrb. 56: 524-525. 1921.—This is no. 12 of the series: Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. DIELS. Three species, *Smythea pacifica* Seem., *Colubrina asiatica* Brongn., and *Alphitonia excelsa* Reiss. are listed for this region.—K. M. Wiegand.

4688. LAUTERBACH, C. *Die Lecythidaceen Mikronesiens*. [The Lecythidaceae of Micronesia.] Bot. Jahrb. 56: 527-528. 1921.—This is no. 14 of the series: Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. DIELS. Two species are listed: *Barringtonia racemosa* Bl. and *B. speciosa* L. f. The former is generally distributed at lower altitudes.—K. M. Wiegand.

4689. LINDSTRÖM, A. *Marstrandsöns Ormbukar och Fanerogamer*. [The ferns and phanerogams of the Island of Marstrand.] Bot. Notiser 1920: 177-210. 1920.—The island is very rocky and the shores very barren. A meager flora might be expected, especially as part of the island is occupied by the town and the old fortress. After 14 years of study by the author and partly by Nordstedt, a list of 13 fern worts and more than 600 species, varieties, and hybrids of phanerogams is published. Among these there are described 2 subspecies, 3 varieties, 1 hybrid and 19 species of *Rosa*. As the author has a very peculiar system in this genus, it is scarcely possible to tell whether these should be regarded as species or subspecies, he using binomials for both categories and calling both "sp. nov." As an appendix are added lists, without notes, of the plants found on neighbouring small islands: Hamneskär 33, Gråen 91, Östra Kråkan 76, Vestra Kråkan 52, and Kråkan at Rösselvik 56 species and varieties.—P. A. Rydberg.

4690. LONG, BAYARD. *A station for Croton glandulosus in New Jersey*. Rhodora 23: 221-223. 1921.—A description is given of a large well established colony as a new station for this species along the railroad embankment near Atco, New Jersey. This is a tropical American species known in northeastern U. S. A. as one of the ballast plants formerly found about certain Atlantic seaports. It is suggested that this colony may have originated from seed dropped with car-sweepings.—James P. Poole.

4691. LONG, C. A. E. *Some rare plants from Knox county, Maine*. Rhodora 23: 198-199. 1921.—This is an addition to a previously published list of noteworthy Matineus plants, together with a list of a few interesting species collected from other parts of Knox County.—James P. Poole.

4692. LYNES, H. *Notes on the natural history of Jebel Marra*. Sudan Notes and Records 4: 119-137. 1921.—Notes are recorded of the occurrence of a number of vascular plants in this region, based on specimens obtained in the expedition of 1920.—C. W. Dodge.

4693. MERRILL, E. D., L. DIELS, and REHDER. [List of determination of plants collected in Kiangsi and Chekiang.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 7: 958-964. 1922.—A list is given of 211 plants collected in the provinces of Kiangsi and Chekiang, with the botanical names.—Chunjen C. Chen.

4694. NELSON, AVEN. *Flora of the Navajo Indian Reservation II*. Amer. Bot. 28: 20-25. 1922.

4695. NELSON, JAMES C. *Notes on the ballast-vegetation at Linnton, Oregon*. Torreya 23: 1-3. 1923.—The list of plants as reported in Torreya 17: 151-161. 1917, has been much diminished by the construction of a ship-yard on the area. A list is presented of 20 species that still persist, and seem likely to become permanent additions to the flora of Oregon.—J. C. Nelson.

4696. PARKER, CHARLES S. *Lathyrus Nissolia* a recent introduction in the state of Washington. *Rhodora* 23:246. 1921.—The author found this species growing on a dry hillside near Pullman, blooming in profusion about July 1.—*James P. Poole*.

4697. ROMPAEY, EM. VAN. Ingebrachte planten in de omgeving van Antwerpen. [Introduced plants in the vicinity of Antwerp.] *Naturwettenschapp. Tijdschr.* 3: 134-138. 1921.—The author presents a list of 80 introduced seed plants with notes on acclimatization and original sources of introduction.—*C. D. La Rue*.

4698. SMALL, JOHN K. Another *Sonchus* for America. *Torreyia* 21:100-101. 1921.—*Sonchus uliginosus*, Bieb., a species of Russia not previously reported from the U. S. A., is represented in the herbarium of the New York Botanical Garden by specimens collected near Hecktown, Northampton County, Pennsylvania, by Eugene A. Rau, July 21, 1921.—*J. C. Nelson*.

4699. STANCLIFF, J. O. Botanical notes from Tahiti. *Amer. Bot.* 29: 3-6. 1923.—A few popular notes on the common plants of that region are recorded.—*S. P. Nichols*.

4700. STEVENS, O. A. The Turtle Mountains of North Dakota. *Amer. Bot.* 28: 9-14. 1922.—The author presents an account of the topography and flora of the region.—*S. P. Nichols*.

4701. TOVEY, J. R. The introduced flora of Victoria. *Jour. Dept. Agric. Victoria* 19: 614-618. *Fig. 1-6*. 1921.—Brief comments are given on 14 species of introduced plants.—*Wm. E. Lawrence*.

4702. WHITE, C. T. Notes on the genus *Flindersia* (Family Rutaceae.) *Proc. Linnean Soc. New South Wales* 46: 324-329. 1921.—This genus was founded by R. Brown in 1814 on *Flindersia australis*, the "crow's ash" of Queensland or "teak" of northern N. S. W. Eighteen species are known, only 3 of which are found outside Australia. The others all grow in Queensland while 6 of these extend into N. S. W. The genus includes some of the most important timbers of Eastern Australia, as "crow's ash" (*F. australis*), "yellow wood" (*F. Oxleyana*), "North Queensland maple" (*F. Brayleyana*), "silk wood" (*F. Pimenteliana*), and "silver beech" or "Putts pine" (*F. acuminata*). Detailed notes and references are given on the following species: *F. Pimenteliana* F. v. Muell., *F. Bourjotiana* F. v. Muell., *F. Brayleyana* F. v. Muell., *F. Schottiana* F. v. Muell., *F. pubescens* (F. v. Muell.), Bail., *F. collina* Bail., *F. maculosa* (Lindl.) Benth., *F. Strzeleckiana* F. v. Muell., *F. papuana* F. v. Muell. (doubtful).—*Eloise Gerry*.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

BURTON E. LIVINGSTON, *Editor*

SAM F. TRELEASE, *Assistant Editor*

4703. ANONYMOUS. Ore deposits revealed by plants. *Sci. Amer.* 127: 100. 1922.—This is a summary of an article by LIDGELY, E., in *Proc. Australian Mining Inst.*, the date is not given. In Michigan and Wisconsin *Amorpha canescens* indicated the presence of underlying galena beds; *Convolvulus althacoides* in Spain showed the presence of underlying deposits of phosphate ore; and in Montana, *Erigonum ovalifolium* the existence of silver ores; etc.—*Chas. H. Otis*.

4704. ANDREWS, F. M. *Trillium nivale*. *Proc. Indiana Acad. Sci.* 1921: 81-86. *Pl. 1, 1 fig.* 1922.—Specimens of *Trillium nivale*, transplanted from the woods, were kept under observation for several years. Many phases of the plants were studied.—*F. C. Anderson*.

4705. ATKINS, W. R. G. The preparation of permanently non-acid formalin for preserving calcareous specimens. Jour. Marine Biol. Assoc. United Kingdom [Plymouth] 12: 792-794. 1922.—Commercial formalin, 40 per cent, may be as acid as pH 2.8. Formalin that is permanently non-acid and only slightly alkaline, close to pH 9, may be prepared by the addition of borax until a good red color is shown with phenolphthalein, or a slaty blue with thymol blue, when added to the diluted formalin.—*Marshall A. Howe.*

4706. BENEDICT, R. C. A Fern Society campaign for wild plant conservation. Amer. Fern. Jour. 12: 131-133. 1922.

4707. BENEDICT, R. C. Progress of the Fern Society program for wild plant protection. Amer. Fern Jour. 13: 18-22. 1923.—The article contains comments on the question of "game laws" and a plea for cooperation in the preservation of wild plant life.—*F. C. Anderson.*

4708. CASTLE, H. The catapult of the fern. Sci. Amer. 127: 330. 5 fig. 1922.—This is a popular article on the sporangium and dispersal of spores in ferns.—*Chas. H. Otis.*

4709. COLLINS, J. H. Sugars of great price. Sci. Amer. 126: 313, 362-363. 2 fig. 1922.—The author considers the prices, characteristics, and some of the uses of rare sugars.—*Chas. H. Otis.*

4710. GARDENWITZ, A. Plants as inventors. Sci. Amer. 126: 402-403. 6 fig. 1922.—A brief review is given of FRANCÉ, R. H., Die Pflanze als Erfinder, in which it is shown that sound engineering principles are practiced by plants.—*Chas. H. Otis.*

4711. HAUSMAN, L. A. The microscopy of foods. A study of starch, the world's premier alimental substance. Sci. Amer. 127: 256-257. 7 fig. 1922.—This is a popular treatment of the subject.—*C. H. Otis.*

4712. KEGEL, K. Aufbereitung und wirtschaftliche Verwendung der Kohlen, insbesondere der Braunkohlen. [Preparation and industrial use of coal, especially lignite.] Naturwissenschaften 10: 855-861, 882-888. 10 fig. 1922.

4713. KLUGH, A. B. The plunger pipette—a new instrument for isolating minute organisms. Jour. Roy. Microsc. Soc. London 1922: 267-268. 1 fig. 1922.—A description is given of a capillary pipette with a delicate glass rod plunger actuated by pressure on the end of the rod and controlled by the resiliency of a piece of rubber tube connecting the pipette with the glass rod.—*Wm. Randolph Taylor.*

4714. McCLUNG, L. The seventy-five mile city. Sci. Amer. 127: 156-157, 213-214. 3 fig. 1922.—This popular exposition of Henry Ford's proposed development of Muscle Shoals presents the agricultural and fertilizer manufacturing aspects.—*Chas. H. Otis.*

4715. SHEPPARD, E. J. A new method of treating and mounting celloidin sections. Jour. Roy. Microsc. Soc. London 1921: 20-22. 1921.—Mounts from 95 per cent alcohol to "Euparal" were satisfactory, the method counteracting the frilling of the celloidin and furnishing a simplified technique.—*Wm. Randolph Taylor.*

4716. STRACHAN, J. The microscope in the paper mill. Jour. Roy. Microsc. Soc. London 1922: 249-260. 1922.—With the introduction of many new fibers into paper manufacture in the latter half of the 19th century, the use of the microscope increased for the determination of these fibers. It is also used in the identification of sizing starches, mineral filling powders and foreign matter, and in connection with the control of fiber length, the grinding of pulp, etc. An outline is given of new or little known ways in which the microscope could be used in commercial practice.—*Wm. Randolph Taylor.*

4717. SUTCLIFFE, H. The use of the microscope in the rubber industry (Eastern plantations). Jour. Roy. Microsc. Soc. London 1922: 245-248. Pl. 12, 13. 1922.—The microscope is used to detect the presence of faults, such as air bubbles, water droplets, rust due to bacteria, yeasts and molds in the pans, and fragments of the bark of the tapped tree; also in the study of diseases of the trees.—*Wm. Randolph Taylor*.

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UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12

SEPTEMBER, 1923

No. 7

ENTRIES 4718-5283

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 4790, 4801, 4878, 4886, 4892, 4907, 4932, 4960, 4990, 5118, 5121, 5126, 5179, 5203, 5240, 5260, 5268, 5270, 5271)

4718. ANONYMOUS. A classification and detailed description of oats of Australia. *Inst. Sci. and Indust. Australia Bull.* 23. 31 p., 4 pl., 4 (col.) fig. 1922.—Australian grown oats of 3 species, *Avena sativa*, *A. orientalis*, and *A. sterilis*, are classed in 27 agricultural varieties and an identification key is presented. The botanical and agricultural characters used in classification are discussed in detail. Of the varieties, 6 were produced by breeding in Australia.—*L. R. Waldron.*

4719. ANONYMOUS. A classification and detailed description of the barleys of Australia. *Inst. Sci. and Indust. Australia Bull.* 22. 33 p., 1 pl., 4 fig. 1922.—Australian-grown barleys of 4 botanical varieties are grouped into 7 classes, 15 types, and 35 agronomic varieties. The botanical and agricultural characters used in classification are discussed in detail.—*L. R. Waldron.*

4720. ANONYMOUS. Australian salt-bush in South Africa. *Jour. Dept. Agric. Victoria* 19: 635-636. 1921.—The characteristics of 7 species of Australian salt-bushes are briefly described and cultural methods for Australian conditions briefly discussed.—*H. L. Westover.*

4721. ANONYMOUS. Local trials with sunflowers as silage. *Agric. Gaz. New South Wales* 34: 158. 1923.—The silage was unpalatable due probably to its high acidity.—*L. R. Waldron.*

4722. ANONYMOUS. Sudan grass: *Andropogon sorghum sudanensis*. *Jour. Dept. Agric. Victoria* 19: 507-508. 1921.—This article describes the grass and discusses its culture, including climatic and soil conditions, seed-bed preparation, time and methods of sowing, fertilizers, pasturing, and harvesting. Among the fertilizers tested Sudan grass responded very readily to superphosphate, 100 pounds per acre giving an increase of 73 per cent in yield above the unmanured check plot.—*H. N. Vinall.*

4723. ANONYMOUS. **The cultivation of maize.** Jour. Dept. Agric. Victoria 19: 668-676. 4 fig. 1921.—The essentials of maize culture are considered, including such topics as varieties, rotations, preparation of seed bed, rate, date and method of planting, fertilizers, cultivating, harvesting and selecting, testing, and caring for the seed.—*F. D. Richey.*

4724. ANONYMOUS. **Undersogelser over Landbrugets Driftsforhold Regnskabsresultater fra Danske Landbrug.** [Examination of results of agricultural experiments.] Tidsskr. Landokonomi 1923: 74-87. 1923.—The different soil characteristics in North and South Jutland, the Island of Zealand and other Danish islands including Bornholm in the Baltic Sea, are discussed.—*Albert A. Hansen.*

4725. BARTLETT, H., and W. D. KERLE. **Farmers' experiment plots. Wheat, oat and barley experiments, 1922.** Agric. Gaz. New South Wales 34: 161-170. 1923.—Cooperative experiments were conducted upon 27 private farms. Tables show precipitation, cultural details, and yields. Federation, Hard Federation, and Canberra wheats gave satisfactory results. Plots receiving phosphatic fertilizers produced significantly greater yields in comparison with check plots.—*L. R. Waldron.*

4726. BECHDEL, S. I. **Sunflower silage for milk production.** Pennsylvania Agric. Exp. Sta. Bull. 172. 16 p. 1922.—Sunflower silage and corn silage are compared as to quantity of milk and butter fat produced and effect on the weight of dairy cows. It was found that sunflower silage contains about 4 per cent less dry matter than corn silage but is practically equal to the latter in all the principal food elements except nitrogen-free extract.—The results of 2 feeding tests with dairy cows indicated that (1) sunflower silage was less palatable than corn silage, (2) the cows produced only 86.4 per cent as much milk when fed sunflower silage as when fed corn silage, and (3) a silage $\frac{1}{2}$ sunflower and $\frac{1}{2}$ corn fed in normal amounts produced less than 92.6 per cent as much milk as a corn silage ration.—*H. N. Vinall.*

4727. BLAKELY, W. F. **Weeds of New South Wales.** Agric. Gaz. New South Wales 34: 181-185. 1 fig. 1923.—*Carduus arvensis* (Canada thistle) is reported for the 1st time in N. S. W. It is described and methods of control are suggested.—*L. R. Waldron.*

4728. BRACKEN, JOHN. **Dry farming in western Canada.** xxi + 386 p. The Grain Growers' Guide, Ltd.: Winnipeg, Canada, 1921.—This is a text book in 17 chapters dealing with the soil and its management under western conditions. It covers the development of dry farming; the climate of western Canada in its relation to crop production; the soil; the moisture problem; dry farm crops and cropping practices; the principles of tillage; breaking the virgin prairie; preparing park belt land for its first crop; tillage of stubble land; summer fallow; crop rotations; weeds and their control; irrigation farming in western Canada; causes and control of low yields; management of special soils; lessons from experience; and the problems of crop production. The chapter on soils was contributed by ROY HANSEN; the chapter on irrigation by W. H. FAIRFIELD; and the chapter on lessons from experience, by 10 of the leading agronomists of the Great Plains region of Canada and the U. S. A. The book "presents under one cover a more or less complete statement of our present knowledge concerning the methods of producing crops at a profit under relatively dry conditions."—*John S. Cole.*

4729. CALL, L. E. **Increasing the efficiency of agronomic research.** Jour. Amer. Soc. Agron. 14: 329-338. 1922.—Presidential address.—*F. M. Schertz.*

4730. CH[ÉVALIER], A. [Rev. of: ROUEST, (L.). *Le soja et son lait végétal, applications agricoles et industrielles.* (Agricultural and industrial applications of the soybean and soybean milk.) 8°, 157 p., 8 fig. Bibliothèque de technique agricole moderne; Paris, 1921.] Rev. Bot. Appl. et Agric. Coloniale 2: 34-37. 1922.—The reviewer believes that the new varieties of soybeans mentioned by the author as well fixed should not be so regarded until years of selection have made them constant. He agrees with the author that there should be a station established for the study of applied genetics in France, and also that the cultivation of the soybean should be extended throughout France and her colonies.—*Paul Russell.*

4731. CONNER, S. D. **Use of muck soils for the production of general farm crops.** Jour. Amer. Peat Soc. 16: 5-9. 1923.—In the U. S. A. there are some 15 million acres of swamp land, consisting largely of peaty soils. In Michigan and Indiana alone there are over 3 million acres of swamp land. Experiments have proved that practically all crops grown on other soils in the same locality can be grown on peat.—*Mary R. Burr.*

4732. DUCELIER, L. **Les pâturages du Maroc. Considérations générales sur l'amélioration de la production fourragère dans l'Afrique du Nord.** [The pastures of Morocco. General considerations on the improvement in the production of forage in northern Africa.] 52 p. Imprimerie algérienne: Algeria, 1919. [Bibliothèque du colon du Nord de l'Afrique.]—In spite of the great importance of forage in Morocco, the pastures and hay fields of the country yield much less than would be the case if greater care were given them. Means suggested to increase the yields and the value of the forage include the prevention of the seeding and spreading of weeds, proper cultural care of the fields, better methods of harvesting hay, the growing of forage plants, and the domestication and cultivation of native plants of forage value. Lists are given of the grasses, legumes, and other plants growing in the fields of the various regions of Morocco, with notes on their relative importance as sources of forage.—*Jessie Wood.*

4733. GREENWOOD, F. W. **Liming and manurial trials with rape at Martinsborough.** New Zealand Jour. Agric. 24: 213-218. 1922.—Experiments were carried out to determine whether lime was beneficial to rape and whether uncrushed lime from the local deposit could be used as profitably as burnt lime or ground limestone, which was shipped in and cost on the land twice as much as the local lime. Another problem was the effect of the lime on certain phosphate fertilizers. The results showed that (1) lime yields beneficial results; (2) while the imported ground limestone acts more quickly the local screened limestone is more economical; (3) superphosphate and lime gave better results than superphosphate alone. All tests were made on rape.—*H. N. Vinal.*

4734. HARTWELL, BURT L. **Liming with high-magnesium versus high-calcium limes.** Rhode Island Agric. Exp. Sta. Bull. 186. 19 p. 1921.—Results of field experiments from 1909 to 1920 are reported. In 1917, the ratio of magnesium oxide to calcium oxide in dried endive was, respectively, 1 to 1.1 and 1.5 with magnesian hydrate and limestone; whereas it was 1 to 2.2, 3.0, and 2.8 with calcic hydrate and limestone, and with no lime.—Certain sensitive crops have been benefited very much by the liming; the beet crop, for example, was frequently increased 6 fold. Even such sensitive crops, however, did not react to liming in such a way as to warrant generalizations concerning specific effects of the different kinds of lime.—As an example of the effect of crops on a following crop, on the unlimed soil, onions at the rate of 92 bushels were produced after sugar beets, 288 after beans, 319 after onions, and 400 after endive; whereas, on the adjoining limed plot, the range was only from 485 to 590 bushels.—In a mixture, the proportion of red clover and timothy was about twice as great on the limed areas as on the unlimed plot, whereas the reverse was true of the alsike clover and red top.—*B. L. Hartwell.*

4735. HARTWELL, BURT L., and F. R. PEMBER. **The feeding power of certain cereals, and their response to fertilizer ingredients.** Rhode Island Agric. Exp. Sta. Bull. 190. 27 p. 1922.—In the field was exhibited (1) a low response to nitrogen by spring rye, to phosphorus by buckwheat, oats, and millet, and to potassium by rye, oats, millet, and spring wheat; (2) a medium response to nitrogen by oats and wheat, to phosphorus by barley, rye, and wheat, and to potassium by barley and buckwheat; and (3) a high response to nitrogen by millet, buckwheat, and barley. Usually the conditions favored oats, buckwheat, and millet more than the other crops.—With liberal fertilizer each cereal grew somewhat better following wheat, barley, and oats than following rye, and also following buckwheat instead of millet. The growth of buckwheat was much depressed by a preceding crop of millet.—Feeding power of crops may depend more on their longevity, and on the fact that the most active growth occurs at different times, than to marked differences in ability to absorb nutrients during one definite period under a uniform set of soil conditions.—*B. L. Hartwell.*

4736. HOLLISTER, BERTHA A. **The relation between the common weeds of Michigan and those found in commercial seed.** Rept. Michigan Acad. Sci. 22: 187-188. 1920.—In general the relative frequency of weed seeds in samples of commercial seeds shows a close correlation to the abundance of the weeds in the state. This does not hold true for some weeds where such seeds are very easily and thoroughly cleaned out of the commercial seed by only moderate fanning, e.g., *Linaria linaria*, *Asclepias syriaca*, *Leontodon tarazacum*. On the other hand the pappus of *Cirsium arvense* is so easily detached from the akene that the latter remains with the crop seed and only the pappus is removed by the fanning. The origin of the seed may often be determined by the weed seeds present.—*Ernst A. Bessey*.

4737. HOPKINS, C. G. **How Greece can produce more food.** Illinois Agric. Exp. Sta. Bull. 239. 433-467. Fig. 1-15. 1922.—Cyril G. Hopkin's report on agricultural conditions existing in Greece and recommendation of some practical scientific methods for improving the conditions is reprinted as it was prepared by him for presentation to the people of Greece.—*O. H. Sears*.

4738. HOWELL, J. PRYSE. **The productivity of hill farming, being the report of an inquiry in three typical districts.** 23 p. Oxford University Press: London, 1922.—A study of the problems confronting parts of West Britain relating to improvement of breeds, destruction of goose heather and bracken, shelter belts, marketing, control of commons, drainage, and manuring and short rotations is reported.—*A. J. Pieters*.

4739. HOYER, JAMES. **Det Kgl. danske Landhusholdningsselskabs Kontrol med Korn og Foderstoffer i Kobenshavns Frihavn i Aaret 1922.** [The Royal Danish Agricultural Society's control with wheat and cattlefood in Copenhagen's free harbor during the year 1922.] Tidsskr. Landokonomi 3: 157-164. 1923.—The Royal Danish Agricultural Society maintains a "control and inspection" office at the famous Free Harbor of Copenhagen. The inspector here reports results for the year 1922.—*Albert A. Hansen*.

4740. HULBERT, H. W. **Factors affecting the stand and yield of sweet clover.** Jour. Amer. Soc. Agron. 15: 81-87. 1923.—Various methods of seeding sweet clover lead to the following conclusions: the higher the rate of seeding the greater the loss in stand. Where a nurse crop was used the reduction in stand was greatest. The lighter rates of seeding produced satisfactory yields, but the poorest was very coarse and stemmy. Peas made a more desirable nurse crop than any of the small grains. There was apparently no relation between the water requirement of the crop and its desirability from the standpoint of effect upon stand and yield of sweet clover.—*F. M. Schertz*.

4741. KERLE, W. D. **Field wheat and fallowing competition.** Eugowra P., A., and H. association. Agric. Gaz. New South Wales 34: 153-158. 1923.—Crops were scored on yield, freedom from disease, cleanliness, type, evenness and condition, with appropriate weighting. Flag smut and certain root-rot diseases are increasing in the district.—*L. R. Waldron*.

4742. McCULLOCH, W. J. **Recent lucerne experience at Weraroa.** New Zealand Jour. Agric. 25: 162-164. 1922.—A cultivation test to assist in maintaining a stand proved practically valueless. It is concluded that the amount of attention necessary to control the grass and clover renders the production of lucerne economically unsound. A mixture of permanent grasses and clover gave much more satisfactory results.—*H. L. Westover*.

4743. MCFADZEAN, J. S. **Mangels and maize for summer fodder.** Jour. Dept. Agric. Victoria 19: 445-446. 1921.—The author discusses the importance of an abundance of fodder in dairy farming and the methods of soil preparation, planting, cultivating, and utilizing mangels and maize.—*F. D. Richey*.

4744. NOLL, CHARLES F. **The effects of phosphates on early growth and maturity.** Jour. Amer. Soc. Agron. 15: 87-99. 1923.—Data and observations on the effect of phosphate on early growth are summarized, with a few unpublished results secured on fertilizer plots at the Pennsylvania Experiment Station.—*F. M. Schertz.*

4745. PFEIFFER, TH. **Die Möglichkeit eines teilweisen Ersatzes der Phosphorsäure durch Kieselsäure in den Pflanzen.** [The possibility of a partial substitution of phosphoric acid by silicic acid in plants.] Mitteil. Deutsch. Landw. Ges. 38: 196-198. 1923.—This is a review of a paper by O. LEMMERMANN and H. WIESSMANN [Zeitschr. Pflanzenernährung und Düngung, Heft 5, 1922], who showed that when plants are well supplied with nitrogen and potash, silicic acid in addition to phosphoric acid increases the yield of grain in oats. Pfeiffer suggests that silicic acid can replace part of the phosphoric acid in stems and leaves and thus leave more phosphoric acid free for the organic combinations present in the grain.—*A. J. Pieters.*

4746. PITT, J. M. **Farmers' experiment plots. Winter green fodder experiments, 1922.** Agric. Gaz. New South Wales 34: 175-180. 2 fig. 1923.—Heaviest yields were secured from certain varieties of oats combined with a legume. Inclusion of a legume with oats made a very decided increase in yield. Satisfactory yields were secured from wheat grown for green forage.—*L. R. Waldron.*

4747. POLE, EVANS, I. B. **Ambari or Deccan hemp: Hibiscus cannabís L.** Jour. Dept. Agric. Union of South Africa 1: 570-580. Pl. 1-4. 1921. [Reprinted from South African Jour. Indust. 1: No. 3.]—Ambari, an erect annual yielding a bast fiber called Bimlipitam jute, Deccan hemp, and Gambo, is native in Africa and now widely distributed through India, Asia, and Australia. It is cultivated in India (also in Senegal where its fiber is called "da"). It is abundant and troublesome as a weed in some localities in South Africa. The plant grows 5-11 feet high, with considerable variation in branching, time of maturity, and robustness. The stem and leaf stalks are prickly and the seed pods bristly. No attempt has been made to produce the fiber in South Africa, but samples of the fiber from plants in different stages of maturity and different periods of water retting, 27-72 days, have been submitted to the Imperial Institute in London, which reports that if properly prepared, this fiber might find a ready market, serving the same purpose as jute. Experiments at Pretoria show that the plants may be retted in 10-14 days with water at 18-26°C., yielding 10.7-11.9 per cent of good fiber. Improving the plants and developing methods for preparing the fiber are necessary to establish the industry in South Africa.—*Lyster H. Dewey.*

4748. POPP, M., und J. COUTZEN. **Die Bedeutung einer Magnesiadüngung für unsere Kulturpflanzen.** [The importance of magnesium fertilization for cultivated plants.] Landw. Jahrb. 58: 313-354. 1923.—This is a study of the influence of magnesium on the growth of cultivated plants. The results may be summarized as follows: The addition of various salts of magnesium to potassium salts, both on sandy and peat soils, did not influence appreciably the yield of various crops. The crop yield is greatly influenced by the physiological reaction of the fertilizing salts, depending on the reaction of the soil. The potassium content of plants is greatly influenced by the potassium fertilizer; however, the former cannot be used as an index of the latter. In some cases of low crop yields, due to lack of potassium fertilizer, as in the cases of grasses and straw, the percentage content of potassium may be higher than in the crops receiving applications of this fertilizer. The magnesium content of plants has usually been incorrectly recorded. The tables of Stutzer need to be corrected. The magnesium content of plants is not influenced appreciably by potassium or magnesium fertilizer. The utilization of soil potassium is usually parallel to that of soil magnesium. The quantities of magnesium present in most soils are sufficient for the need of the cultivated plants tested.—*S. A. Waksman.*

4749. PRIDHAM, J. T. *Jottings on the past season at Cowra.* Agric. Gaz. New South Wales 34: 159-160. 1923.—Varieties of oats, wheat, and peas are discussed.—*L. R. Waldron.*

4750. SMALL, JOHN K. *The Austrian field cress again.* Torreyia 23: 23-25. 1923.—Supplementing the notes of A. A. Hansen in Torreyia 22: 73-77 [see Bot. Absts. 12, Entry 48] on the occurrence in New York, of *Roripa austriaca* Spach, for which Small here creates the new combination *Radicula austriaca* (Crantz) Small, the author reports the finding of the same plant by A. L. Stone on the farm of the University of Wisconsin. It produces no fruit, and is propagated readily by the roots. It seems to have been imported in alfalfa seed from Turkestan, and is spreading rapidly.—*J. C. Nelson.*

4751. STROUP, FREEMAN P. *Corn and its products.* Amer. Jour. Pharm. 94: 788-797. 1922.—A popular lecture.—*Anton Hogstad, Jr.*

4752. STUART, W. *The potato: its culture, uses, history, and classification.* ix + 518 p, 5 pl., 267 fig. J. B. Lippincott Co.: Philadelphia and London, 1923.—This is a comprehensive and practical treatise dealing with the many factors involved in the production of potatoes in the U. S. A. The industrial uses of the crop are enumerated, the botany and history are given in summary form, and potato breeding and selection are discussed. Classifications are reviewed, a modification of that of the author (U. S. Dept. Agric. Bull. 176) being supplemented by plates in colors of typical tubers and floral organs of leading varieties. A student's project in growing potatoes for profit, a list of varieties with their characteristics, groups and origin for each, and the yearly average acreage and production by states and by the Canadian provinces are appended.—*H. M. Steece.*

4753. WAGNER. *Die Bedeutung der Gründüngung unter den heutigen Verhältnissen.* [The significance of green manuring under present conditions.] Mitteil. Deutsch. Landw. Ges. 38: 201-203. 1923.—In this address the speaker reports his personal experiences with green manures. The value of clover, either red or a mixture of red, alsike and white, seeded in grain and turned under for the next grain crop, is especially emphasized.—*A. J. Pieters.*

4754. WILSON, H. C. *Comparative costs of production of oats for grain and hay on stubble and fallow land.* Jour. Dept. Agric. Victoria 19: 306-309. 1921.—Comparative experiments indicate that oats for grain and hay can be grown at much less cost per bushel and ton, respectively, on fallowed land than on stubble or green ploughed land, even in a season of good rainfall, when the stubble land has the advantage. Yield of hay per acre was 61 hundred weight on fallowed land and 38 hundred weight on stubble land, which made the cost of production 29 s. 3 d. and 39 s. 3 d. per ton, respectively. When grown for grain, fallow land gave 62.4 bushels and stubble land 38 bushels per acre. After allowing for the sale of straw, the actual cost per bushel was 1 s. $\frac{1}{2}$ d. for fallow land and 1 s. 4 $\frac{1}{2}$ d. for stubble land.—*W. J. Morse.*

4755. YANTIS, R. E. *Farm acreages, values, etc.* Texas Dept. Agric. Bull. 70. 42 p. 1922.—A map of Texas shows chief crops of each area. Statistics are given in tabulated form by counties, of ownership, expenditures, acreage, etc.—*L. Pace.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

CARROLL W. DODGE, *Editor*

CHARLES A. WEATHERBY, *Assistant Editor*

(See also in this issue Entries 4930, 4990, 5020, 5129, 5131, 5142, 5163, 5166)

4756. ANONYMOUS. *A curatorship of plant pathology.* Brooklyn Bot. Gard. Rec. 10: 18-19. 1921.—Announcement is made of a gift to the Brooklyn Botanic Garden of \$50,000 to become available over a period of 4 years from Jan. 1, 1921, for research in plant pathology. Also announcement of the appointment of George Matthew Reed as curator of plant pathology to have charge of the new work.—*C. S. Gager.*

4757. ANONYMOUS. **A new botanic garden.** Brooklyn Bot. Gard. Rec. 12: 23. 1923.—This proposed new botanic garden and arboretum at Joliet, Illinois, has a nucleus of 327 acres, on which, according to Willard N. Clute, commissioner in charge of the grounds, practically every kind of American tree that will stand the climate has been growing for nearly 20 years. Other commissioners are Messrs. James H. Ferriss and Pilcher of Joliet.—*C. S. Gager.*

4758. ANONYMOUS. **A new botanic garden in Holland.** Brooklyn Bot. Gard. Rec. 11: 111-112. 1922.—The University of Utrecht has come into possession of a 2nd botanic garden, presented to the botanical department of the university by the heirs of August Janssen, deceased in 1919. The tract, known as "Cantonspark," is situated on the outskirts of the village of Boarn, about 18 km. from Utrecht. A. Pulle, professor of systematic botany, University of Utrecht, has been made director of the new garden, while F. A. F. C. Went retains the directorship of the botanical garden in Utrecht.—*C. S. Gager.*

4759. ANONYMOUS. **An index to periodical literature.** [Rev. of: *The subject index to periodicals. K: science and technology. 555 p. Library Association: London, 1922.*] Nature 111: 214-215. 1923.—This contains titles of 15,000 papers published in 400 periodicals during the years 1917-19.—*O. A. Stevens.*

4760. ANONYMOUS. **Note.** Nature 111: 266. 1923.—An exhibit has been installed at Kew Gardens, consisting of funeral wreaths, etc., from Egyptian tombs of 1100 and 1700 B. C. The flowers chiefly used are *Nymphaea coerulea*, *Acacia arabica* var. *nilotica*, together with leaves of *Mimusops Schimperii* and *Salix Safsaf*. These are identical with species found growing at the present day.—*O. A. Stevens.*

4761. ANONYMOUS. **Obituary. Prof. Gaston Bonnier.** Nature 111: 265. 1922.—This is a brief note on the activities of Bonnier. "His published research on the correlation of function, form, and structure of plant organs is as remarkable for its simplicity and clearness of style as for its scientific value." He "played a most important part in the reform and extension of the teaching of the natural sciences in France."—*O. A. Stevens.*

4762. ANONYMOUS. **The Knox Arboretum and Botanic Garden.** Brooklyn Bot. Gard. Rec. 11: 113. 1922.—The new arboretum and garden between Thomaston and Warren, Maine, is being developed under the auspices of the Knox Academy of Arts and Sciences. This institution, established in 1908, now has 60 acres. The director is Norman W. Lermond. There is a growing library and herbarium, and a List of Trees and Shrubs in the Knox Arboretum has been published.—*C. S. Gager.*

4763. ANONYMOUS. **The old Linnean garden at Upsala.** Brooklyn Bot. Gard. Rec. 11: 112. 1922.—This is a quotation from an article by C. S. SKOTTSBERG [Bull. Misc. Information, Kew, No. 6, 1920] on the restoration of Linnaeus' botanic garden according to the original plan.—*C. S. Gager.*

4764. ANONYMOUS. [Rev. of: RHODE, ELEANOUR SINCLAIR. *The old English herbals. xii + 243 p. Longmans, Green and Co.: London, 1922.*] Nature 111: 143. 1923.—The book is very readable, but the limitation to English herbals is unfortunate in the respect that few of these had any influence on the course of botany.—*O. A. Stevens.*

4765. BRIDEL, MARC. **Emile Bourquelot, 1851-1921.** Bull. Soc. Chim. Biol. 3: 253-258. 1921.—A biographical sketch is presented. Bourquelot discovered 6 enzymes,—trehalase, pectosase, pectinase, seminase, gease, and gentiobiase,—and considerably extended knowledge of inulase, invertin, lactase, maltase, gaulterase, and the oxidases. His most important contribution to enzyme chemistry was the discovery of the synthetic action of certain enzymes and consequently of the reversibility of enzyme action.—*Joseph S. Caldwell.*

4766. EBERLE, E. G. **Clement Belton Lowe.** Obituary. *Amer. Jour. Pharm.* **95**: 159-162. *Pl. 1.* 1923.—This is a sketch of the life and activities of Dr. Lowe, Professor Emeritus of *Materia Medica*, Philadelphia College of Pharmacy, who died Feb. 5, 1923. He was editor of *The Medicinal Plants of the Philippines*, author of *A Syllabus of the Botanical Natural Orders*; and an active member of the American Pharmaceutical Association.—*Anton Hogstad, Jr.*

4767. EBERLE, E. G. **Edward Morell Holmes.** *Jour. Amer. Pharm. Assoc.* **12**: 193-195. *Pl. 1.* 1923.—This is a brief sketch of the British botanist, who has concluded a half-century as curator of the Museum of the Pharmaceutical Society of Great Britain. He was awarded the British Pharmaceutical Society's bronze medal for an herbarium of British plants, the Flückiger medal, and the Hanbury medal. Reference is made to some of the collections of the museum sorted and catalogued by Holmes.—*Anton Hogstad, Jr.*

4768. EBERLE, E. G. **Émile Perrot, D. ès-Sc.** *Jour. Amer. Pharm. Assoc.* **12**: 289-290. *Portrait.* 1923.—Perrot, Hanbury medalist, 1922, distinguished himself by his researches on *materia medica*, which include the various species of *Cinnamomum* and *Strychnos*, the gentians, coriander fruits, Kinkeliba, savin, ginseng, kola nuts, balsam tolu, etc. The most important research is that published with M. Goris, on the stability of vegetable drugs and the preparation of what have been termed "physiological vegetable extracts" or "intracts." The process for these involves the destruction of all enzymes, whereby the drugs and their preparations possess the physiological action of the fresh plant and retain it indefinitely.—*Anton Hogstad, Jr.*

4769. GERSHENFELD, LOUIS. **Louis Pasteur.** *Amer. Jour. Pharm.* **94**: 766-782. 1922.—The life and varied scientific activities of Louis Pasteur are reviewed.—*A. Hogstad, Jr.*

4770. HAAN, H. R. M. DE. **Overzicht der koffieliteratuur.** [Survey of coffee literature.] Mededeel. Proefsta. Malang. **39.** 58 p. 1923.—A list of 678 numbered titles arranged alphabetically by authors is followed by a classified list in which the titles are referred to by number only.—*J. R. Schramm.*

4771. LAWALL, CHARLES H. **The romance of spices.** *Amer. Jour. Pharm.* **95**: 193-223. *Fig. 1-8.* 1923.—This popular lecture contains brief notes concerning individual spices.—*Anton Hogstad, Jr.*

4772. LENDNER, A. M. **Eugène Privat, Avocat.** [Eugene Privat.] *Bull. Soc. Bot. Genève* **13**: 34-35. 1921.—This charter member and former president of the Botanical Society of Geneva died Dec. 1, 1921.—*W. H. Emig.*

4773. MALTE, M. O. **The first fifty years of the Arnold Arboretum.** *Canadian Field Nat.* **37**: 28-30. 1923.—A synopsis is given of a paper with the above title appearing in the *Jour. Arnold Arboretum* **3**: 127-171. 1923.—*W. H. Emig.*

4774. NEWCOMBE, C. F. **Menzies' Journal of Vancouver's Voyage, April to October, 1792.** *Archives of British Columbia, Victoria*, 1923.—Besides the text of the Journal, the publication contains a biography of Menzies (by J. Forsyth), and a list of Menzies' publications and of plants collected by him on the northwest coast of America. The plants are grouped as follows: (1) ferns and flowering plants, 335 species; (2) mosses, 24 species; (3) lichens, 18 species; (4) marine algae, 22 species.—*G. B. Rigg.*

4775. NICLOUX, MAURICE. **Armand Gautier, 1837-1920.** *Bull. Soc. Chim. Biol.* **3**: 248-252. 1921.

4776. RUDOLPH, ADELAIDE. **Henry Vincome Arny.** *Jour. Amer. Pharm. Assoc.* **12**: 99-100. *Pl. 1.* 1923.—This is a brief sketch of the president-elect of the American Phar-

maceutical Association for 1923-1924. As teacher, author, editor, research worker, and association worker his labors have been unremitting and effective. He was awarded the Remington Honor Medal for 1922.—*Anton Hogstad, Jr.*

4777. SEDGWICK, WILLIAM THOMPSON. *Darwin and Pasteur: an essay in comparative biography*. Science 57: 286-289. 1923.—This essay, left unfinished at the death of the author, compares the methods and results of these 2 men.—*C. J. Lyon.*

4778. SMITH, LOUIE H. Professor J. G. Mosier. Jour. Amer. Soc. Agron. 15: 29-30. 1923

4779. STURMER, J. W. Johnny Appleseed. Amer. Jour. Pharm. 94: 699-702. 1922.—The life and activities are sketched of John Chapman, better known as Johnny Appleseed, one of the most picturesque pioneers of the Ohio Valley. Arriving there in 1806, he planted his first nursery near the present town of Steubenville. His seedlings and seeds were distributed without charge, and several of the trees, near Fort Wayne, Indiana, are still bearing fruit. He preceded the country doctor and the village apothecary, being a pioneer in supplying medicine to the settlers. [Printed also in Jour. Amer. Pharm. Assoc. 11: 1022-1024. 1922.]—*Anton Hogstad, Jr.*

4780. UPHOF, J. C. TH. An historic spot for students of genetics. Jour. Heredity 13: 343-345. 3 fig. 1923.—A description is given of the place where in 1886 Hugo de Vries found his mutations of *Oenothera Lamarckiana* on the Spanderswoud estate near Hilversum, Netherlands. At that time the land was a neglected potato field; at present it is partly covered with *Fagus sylvatica* and *Picea excelsa*. By 1921 the forest had developed to a point where it threatened the early extinction of the *Oenotheras*. Accompanying photographs, probably the first ever published of this place, show a general view of the field as it was in 1908, with *Oenotheras* under the beech forest, a wild mutant of *O. oblonga*, and 2 plants of *O. Lamarckiana*.—*J. C. Th. Uphof.*

4781. WHITE, ORLAND E. Botanical exploration in Bolivia. Brooklyn Bot. Gard. Rec. 11: 93-105. 1922.—This is a report to the Director of the Brooklyn Botanic Garden on the botanical work of the Mulford Expedition for the Biological Exploration of the Amazon Basin, June 1, 1921-April 14, 1922.—*C. S. Gager.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 4854, 4905, 4932, 4983, 4989, 4990, 5049, 5051, 5176, 5178)

4782. ANONYMOUS. Prospectus, 1921. Brooklyn Bot. Gard. Rec. 10: 1-18. 1921.—The educational work offered at the Brooklyn Botanic Garden during 1921 is included.—*C. S. Gager.*

4783. ANONYMOUS. Prospectus of courses, lectures, and other educational advantages offered to members and to the general public, 1922. Brooklyn Bot. Gard. Rec. 11: 1-20. 1922.

4784. ANONYMOUS. Prospectus of courses, lectures, and other educational advantages offered to members and to the general public, 1923. Brooklyn Bot. Gard. Rec. 12: 1-20. 1923.

4785. ANONYMOUS. [Rev. of: GILBERT-CARTER, H. Guide to the University Botanic Garden, Cambridge. xvi + 117 p., 24 pl. University Press: Cambridge, 1922.] Nature 111: 216. 1923.

4786. BUCKMAN, H. O. The organization of a general introductory course in soils and the extent to which it should be based on pure science. Jour. Amer. Soc. Agron. 15: 55-59. 1923.

4787. CLARKE, LILIAN J. The botany gardens of the James Allen's Girls' School, Dulwich. 52 p., 10 pl., 1 map, 2 diagr. Board of Education Educational Pamphlet. No. 41. H. M. Stationery Office: London, [date ?] The history and work of the botany gardens, used as an adjunct or outdoor laboratory in connection with the botany classes, is recounted. The main object in developing the gardens has been to make the teaching of botany thoroughly practical by closely associating indoor with outdoor work. Textbooks have been abandoned, the girls being taught to make their own. The garden, of about $\frac{3}{4}$ of an acre, is divided into plots for photosynthesis experiments, plots for pollination experiments, climbing plants on upright screens, beds showing the natural orders (families), vegetable gardens, plant associations including chalk plants, heath plants, a pebble beach, a sand dune, a salt marsh, a small wood produced by planting chiefly *Quercus pedunculata*, and a lane. The instruction given under the above heads is outlined in detail, and lists are given of the species successfully grown in each of the above plots. Only 40 minutes a week is allowed the pupils for this work.—C. S. Gager.

4788. CONARD, HENRY S. That plant. Science 57: 359-360. 1923.—In response to Martin's request [see Bot. Absts. 12, Entry 2984] for suggestions for a good definition of a plant, the writer states that he has used the following, which, is particularly useful in showing that definitions are at best a mere makeshift: "A plant is a living thing which manufactures its own food from the raw materials of earth and air, or one whose ancestors did so."—C. J. Lyon.

4789. DUCEILLER, F. [Rev. of: CHODAT, R. La biologie des plantes. I. Les plantes aquatiques. (Biology of plants. I. Aquatic plants.) 311 p. Atar: Geneva, 1922.] Bull. Soc. Bot. Genève 13: 36. 1921.—The "Biology of plants" by R. Chodat is a book which has no equal.—W. H. Emig.

4790. ETHERIDGE, W. C., and M. L. FISHER. Report of the committee on lectures for a standard introductory course in field crops. Jour. Amer. Soc. Agron. 15: 41-42. 1923.

4791. GORTNER, R. A. What is a plant? Science 57: 614. 1923.—The author, a chemist, suggests a chemical definition for a plant, "a living organism whose cell walls consist predominately of carbohydrate materials."—C. J. Lyon.

4792. GREAVES, JOSEPH E. Agricultural bacteriology. xv + 437 p., 48 fig. Lea & Febiger: Philadelphia and New York. 1922.—The book is divided into 36 chapters. The first 4 are devoted to the history of bacteriology, occurrence, morphology, and classification of bacteria. Physiology is treated in the following 7 chapters, including the composition and metabolism of bacteria, bacterial enzymes, and influence of temperature, light, and other physical factors as well as chemical agents upon bacteria. Soil bacteriology occupies the largest portion of the book, covering the next 15 chapters. These are devoted to the study of the influence of heat, volatile antiseptics, arsenic, salts, and manure on bacterial activities in the soil; followed by a study of methods for the determination of the soil flora, solvent action of bacteria, carbon-, nitrogen-, sulfur-, and phosphorus-cycle of bacteria and the most important transformations in the soil, namely, decomposition of nitrogenous and non-nitrogenous organic matter, nitrification and denitrification, symbiotic and non-symbiotic nitrogen fixation, and crop rotation. Of the remaining 10 chapters, 1 is devoted to bacteria in air, 2 to water bacteriology, 1 to sewage, 2 to milk, 3 to food bacteriology, food poisoning, and preservation of food, and 1 to bacteria in arts and industries.—S. A. Waksman.

4793. GUIGNARD, LÉON. Le jardin botanique de la faculté de pharmacie de Paris. [The botanic garden of the faculty of pharmacy of Paris.] 3rd rev. ed., 179 p. Librairie-Marquette:

Toulouse, 1922.—The principal characters of the various groups of plants cultivated in this botanic garden are given. A few plants not grown in the botanic garden are mentioned because of their interest.—*C. S. Gager.*

4794. JORDAN, E. O. *A text-book of general bacteriology. 7th ed., 744 p.* W. B. Saunders Co., Ltd.: Philadelphia and London, 1922.—In this edition the chapters on influenza and anaerobes have been entirely rewritten, and chapters on streptococci, pneumococci, and typhus fever extensively revised. Important additions have been made to the sections on immunity, yellow fever, and others. The chapter on methods of studying bacteria has been entirely rewritten and enlarged.—*C. S. Gager.*

4795. KENDALL, ARTHUR ISAAC. *Bacteriology, general, pathological, and intestinal, 2nd ed. rev., xi + 680 p., 99 engravings, 8 col. pl.* Lea and Febiger: New York and Philadelphia, 1921.—Section I, general bacteriology; section II, pathogenic bacteria; section III, higher bacteria, molds, yeasts, filterable viruses, and diseases of unknown etiology; section IV, gastro-intestinal bacteriology; section V, applied bacteriology. The author emphasizes what bacteria do, rather than what they are,—how they enter tissues, how they feed, excrete, and reproduce, how they escape from the body, and the chemistry of bacterial activity. New technique of handling bacteria, laboratory equipment, and applications of bacteriology in preventive medicine, serology, and vaccine treatment of disease are emphasized.—*C. S. Gager.*

4796. LÖHNIS, F., and E. B. FRED. *Textbook of agricultural bacteriology. ix + 283 p., 9 pl., 66 fig.* McGraw-Hill Book Co. Inc.: New York, 1923.—Most of the material was published in 1913 under the title *Vorlesungen über landwirtschaftliche Bakteriologie*. The present book is not merely a translation from the earlier German work, but is also a thorough revision and rearrangement with the aim of better adapting the book to American and British needs. The introduction is followed by Part I, general morphology and physiology of bacteria and related organisms, with 7 chapters, respectively on: morphology of bacteria and related organisms; development of bacteria, etc.; classification of bacteria, fungi, and protozoa; relations of microorganisms to their environment; counting, isolating, cultivating, and testing bacteria, etc.; sterilization, pasteurization, antisepsis, and asepsis; activities of bacteria, etc. Part II, dairy and soil bacteriology, with 7 chapters, respectively on: bacteria, etc., in food-stuffs; bacteria, etc., in milk; bacteria, etc., in butter; bacteria, etc., in cheese; sewage disposal; bacteria, etc., in barnyard manures; bacteria, etc., in soils.—*C. S. Gager.*

4797. MADISON, HAROLD L. *Trees of Ohio identified by their leaves. 9 x 19 cm., 24 p., 116 fig.* Cleveland Museum of Natural History: Cleveland, Ohio, 1922.—This booklet constitutes No. 1 of the Pocket Natural History series to be issued by the Museum.—*J. R. Schramm.*

4798. REYNOLDS, E. S., and R. T. HANCE. *Pruning the academic tree.* Science 57: 408–410. 1923.—This is an argument for a general survey course in biology to take the place of 2 specialized courses in elementary botany and zoology. It is claimed that this arrangement is much better for the general student; and for the student going on in either field the necessary technical training is given in the next higher courses.—*C. J. Lyon.*

4799. SOSMAN, ROBT. B. *A first revised edition of the Academy's list of one hundred popular books in science.* Jour. Washington [D. C.] Acad. Sci. 12: 469–476. 1922.

4800. TIFFANY, L. H. "What is a plant?" Science 57: 359. 1923.—The writer states his belief that it is better to let the student form his own definition from his observations, rather than to have him learn such a definition as Martin seeks [see Bot. Absts. 12, Entry 2984].—*C. J. Lyon.*

4801. WOLFE, J. K. **Comparative grades in field crops courses.** Jour. Amer. Soc. Agron. 13: 59-66. 1923.

4802. YOUNGKEN, H. W. **Pharmacognosy and the pharmacist.** [Editorial.] Jour. Amer. Pharm. Assoc. 12: 5-6. 1923.—The author calls attention to the many opportunities for those specializing along different lines of pharmacognosy. Commenting upon the requirements for those who desire to become trained pharmacognosists, the author states that the 2-year course is entirely inadequate, and that preparation for the profession should embody, in addition to the necessary studies of the first 2 years, many other subjects, such as English, German, French, zoology, advanced chemistry, etc.—*Anton Hogstad, Jr.*

CYTOLOGY

GILBERT M. SMITH, *Editor*

(See also in this issue Entries 6967, 5070, 5283)

4803. ARBER, A. **Studies on the binucleate phase in the plant cell.** Jour. Roy. Microsc. Soc. London 1920: 1-21. *Pl. 1, fig. 1-2.* 1920.—The binucleate condition is a normal feature of the cells in certain parts of the plants studied. The appearance and the origin, as interpreted by the author, of the duplicate nuclei is described for the following plants: *Eremurus himalaicus*, *Asparagus officinalis*, *Helianthus Nuttallii*, *H. tuberosus*, *Syringa vulgaris*, *Monstera deliciosa*, *Hemerocallis fulva*, *Nothoscordum fragrans*, *Alisma Plantago*, *Polygonum cuspidatum* (= *Polygonum Sieboldii* other authors?) *Morus nigra*, *Hippuris vulgaris*, *Eloдея canadensis*, and *Stratiotes aloides*. Some of these were reexamined in view of the findings of previous authors that the binucleate phase had arisen in them by amitosis, which view is combated.—*Wm. Randolph Taylor.*

4804. BEER, R., and A. ARBER. **On multinucleate cells: an historical study (1879-1919).** Jour. Roy. Microsc. Soc. London 1920: 23-31. 1920.—This historical review emphasizes the authors' view that the reported cases of amitotic duplicate nuclei in vegetative cells are in reality due to mitosis.—*Wm. Randolph Taylor.*

4805. CHAMBERS, R. **New apparatus and methods for the dissection and injection of living cells.** Jour. Roy. Microsc. Soc. London 1922: 373-388. *Fig. 1-5.* 1922.—By means of 3 screws, bars held together at the ends by springs are forced apart so that the free arm of the series can have motion imparted to it in 1 or more of 3 planes. To this end is attached a carrier for a dissection needle or capillary pipette. The "Micro-manipulator" may be attached directly to the microscope or to a pillar. An improved type of pipette for injection into the cells consists of a Luer syringe attached by means of delicate brass tubing to the "micro-pipette." The methods of using the apparatus are described.—*Wm. Randolph Taylor.*

4806. CONN, H. J. **Safranin and methyl green.** Science 57: 304-305. 1923.—A sample of pure, concentrated safranin obtained from the National Aniline Co. gives excellent results in contrast staining and is as good as pre-war Grüber safranin O. Both the Providence Chemical Laboratories and the above company have submitted samples of methyl green that are satisfactory and comparable with the Grüber product.—*C. J. Lyon.*

4807. COWDRY, EDMUND V., and PETER K. OLITSKY. **Differences between mitochondria and bacteria.** Jour. Exp. Med. 36: 521-533. 1922.—The suggestion that mitochondria, found in almost all active cells, are symbiotic microorganisms, would, if verified, exercise a profound influence in biology and medicine. The only reaction thus far claimed to be specific is that of coloration with Janus green B. The authors have attempted to make a direct comparison of Janus green reactions of mitochondria in living lymphocytes and bacteria under exactly the same conditions. Bacteria showing all possible variations have been studied. To rabbit blood was added a small drop of bacterial emulsion and a solution of Janus green in

0.85 per cent saline solution; the whole was mixed by the weight of the cover glass. Mitochondria stained with intensity up to a dilution of 1:100,000. The bacteria were not colored in so high a dilution. The pancreas of a rabbit was also injected with various bacteria, killed, fixed, and stained by various methods. The authors state that the mitochondria and bacteria show "microchemical and tinctorial differences which can only be attributed to a fundamental dissimilarity in their chemical constitution."—*C. S. Hoar.*

4808. DANGEARD, P. A. **Recherches sur la structure de la cellule dans les Iris.** [Concerning the structure of the cells of Iris.] *Compt. Rend. Acad. Sci. Paris* 174: 1653-1659. *Fig. 1 a-e; 2 a-f.* 1922.—A study is reported of the mesophyll and epidermal cells of young and mature leaves of *Iris germanica*. Fixation with the Laguesse solution is preferable to that of Regaud. The development of the plastids in young leaves is described. It is found that the epidermal cells contain elongated slender mitoplasts of an oily nature. Dangeard herewith abandons entirely the terms chondriome, mitochondria, chondriocotes, and chondriomites. He reaffirms his usage of vacuome for the metachromes and ordinary vacuoles, which may give rise to metachromatic corpuscles, anthocyan, or tannin; plastidome, in which are included plastids, mitoplasts, amyloplasts, chloroplasts, etc; and sphérôme, the micromes which are related to the formation of oil.—*C. H. Farr.*

4809. DANGEARD, P. A. **Sur la structure de la cellule chez les Iris.** [Concerning the structure of the cells of Iris.] *Compt. Rend. Acad. Sci. Paris* 175: 7-12. *Fig. 1 (A, B, C), 2 (A, B, C, D), 3 (A, B, C, D, E).* 1922.—A study is made of the conductive tissues, petals, sepals, stamens, ovary, and ovules of *Iris germanica*. Figures are shown of cells from the conductive tracts, stamens, and ovary. It is concluded that the plastidome and sphérôme are permanent cell organs like the nucleus, and that they are transmitted independently from generation to generation. The plastids of the plastidome have various forms as spheroplasts, mitoplasts, and discoplasts, and perform various functions, as xanthoplasts, carotinoplasts, chloroplasts, amyloplasts, oleoplasts, etc. The microsomes of the sphérôme are normally spherical (spherosomes), but may be rod-shaped (mitosomes), and there is some evidence that they may form fat globules (oleosomes). The plastidome and sphérôme exist in the pollen grains and embryo sacs, and are therefore to be considered in discussing the transmission of hereditary characters.—*C. H. Farr.*

4810. DREW, A. H. **Preliminary tests on the homologue of the Golgi apparatus in plants.** *Jour. Roy. Microsc. Soc. London* 1920: 295-297. *4 fig.* 1920.—Fixation of onion root tips with a formol-cobalt nitrate-sodium chloride mixture at 37°C., cutting on a freezing microtome, washing and mordanting at 50-55°C. with chromic-osmic mixture, and staining with iron-alum haematoxylin and pyridine showed numerous granular or short rod-shaped mitochondria. With longer mordanting these became less evident and oval and elongate bodies appeared. With still longer treatment the Golgi apparatus showed as filaments and rods near the nuclei.—*Wm. Randolph Taylor.*

4811. GATENBY, J. B. **Further notes on the oögenesis and fertilization of *Grantia* compressa.** *Jour. Roy. Microsc. Soc. London* 1920: 277-282. *Pl. 5.* 1920.—In the sponges the sperm does not penetrate the egg directly but first enters another cell which transfers it to the ripe oocyte. This is unique among animals. The sperm enters a collar cell where it changes from a probably filiform to a rounded shape. Confirmation is offered of Dendy's description of a process whereby in oögenesis pieces of the nucleolus are extruded into the cytoplasm.—*Wm. Randolph Taylor.*

4812. GATENBY, J. B., and J. H. WOODGER. **On the relation between the formation of yolk and the mitochondria and Golgi apparatus during oögenesis.** *Jour. Roy. Microsc. Soc. London* 1920: 129-156. *Pl. 2, fig. 1-4.* 1920.—An outline is given of the appearance of different cytoplasmic inclusions when prepared by different methods, and definitions of these elements of the cell. In yolk formation in *Grantia* eggs the yolk granules were found to be formed

in the ground cytoplasm independently—not from mitochondria. In Mollusca (*Helix* and *Limnaea*) Golgi elements, mitochondria, and yolk spherules are present in the ripe egg. The germinal epithelia contain Golgi elements and probably also mitochondria. These spread out during development, throughout the oocyte. In the mollusc *Patella* the Golgi elements take an important part in yolk formation, which is more complicated than in *Helix* and *Limnaea*. In Amphibia and Insecta, represented by *Rana* and *Triton*, or *Apanteles* and *Dytiscus* respectively, the mitochondria form a filamentous mass on the peripheral part of the growing oocyte. Later when yolk formation begins the mitochondria may be throughout the oocyte but the yolk discs are formed only at the periphery. "It seems natural to conclude that the yolk grains of the egg are formed from metamorphosed mitochondria, as is believed to occur in other animals." In *Stenobothrus* and *Dytiscus* the Golgi elements seem to be unconnected with the yolk. In *Periplaneta* some of the yolk spheres seem to be formed in the nucleolus and shot out into the egg cytoplasm. For Ascidians the work of Hirschler (1915) is quoted. In *Ascaris* the work of Hirschler (1913) is preferred to that of Fauré-Fremiet, excepting that the mitochondria occasionally swell up to form the large yolk granules. The Golgi elements are not generally intimately associated with the yolk spheres. In Mammalia the Golgi apparatus is at first juxta-nuclear and excentric, but later spreads out, possibly taking no direct part in the formation of yolk or fat. Although true chromatinic chromidia occasionally occur in the cytoplasm during oogenesis (Hymenoptera) almost all cases in Metazoa are really misinterpretations of the mitochondria. Reports of chromatin emission during oogenesis probably are ill-founded.—Wm. Randolph Taylor.

4813. GRAY, JOHN. A critical study of the facts of artificial fertilization and normal fertilization. Quart. Jour. Microsc. Sci. 66: 419-437. 1922.—The author refers to the theory of Loeb that artificially fertilized eggs are activated by 2 substances, a specific cytolyisin, which brings about the destruction of the surface layer of the egg, and a substance which limits or controls the destructive influence of the cytolyisin; and to the theory of F. R. Lillie that the union of the egg and spermatozoon is possible only in the presence of a specific substance or fertilizin secreted by the unfertilized egg. The author claims that not enough attention is given to the physical forces. Loeb's theory serves only for artificial fertilization and Lillie's only for the natural type. The facts appear to indicate that the normal action of the spermatozoon on the egg is essentially physical. Evidence is advanced that the activation of an unfertilized egg by a spermatozoon is due to the electromotive force set up when the 2 gametes come into contact. After activation, normal development occurs only when 2 asters are present. The formation of a fertilization membrane in echinoderm eggs is discussed. Finally the view is expressed that the only essential effect of egg secretions on spermatozoa is the capacity of these substances, in certain cases, of increasing the activity of the male gametes.—C. S. Hoar.

4814. GRAY, JOHN. Surface tension and cell division. Quart. Jour. Microsc. Sci. 66: 235-245. 1922.—It has long been held that surface tension plays the dominant rôle in cleavage. Surface tension has been thought to differ at various places on the cell surface. The author shows that regions of differential surface tension are an unnecessary assumption. It is an equilibrium between a force inside the cell and surface tension which determines shape of the dividing cell. The author uses fertilized eggs of *Echinus miliaris*, *Coleps hirtus*, and 2 oil drops in acid and normal sea water to prove his point. He claims that cell division is due to movement of 2 asters away from each other and that the cleavage furrow is due to an equilibrium between the effect of this movement on the protoplasm and the surface tension of the cell surface.—C. S. Hoar.

4815. GUIGNARD, L. Sur l'existence de corps protéiques particuliers dans le pollen de diverses Asclépiadacées. [On the existence of certain protein bodies in the pollen of diverse Asclepiads.] Compt. Rend. Acad. Sci. Paris 175: 1015-1020. Figs. 1-16. 1922.—In *Asclepias syriaca*, *A. curassavica*, *A. linifolia*, and *Gomphocarpus fruticosus*, pollen tubes, pollen mother cells, and microspores were studied as to the protein granulations and plastids. The protein

bodies are said to resemble chondriosomes, especially chondriocontes. They appear first as granulations, which form short beads, and then slender rods. These protein bodies are for a time within the plastids, later the breaking down of the plastids leaves the protein bodies free. In the last stage these bodies fuse together in a mass.—*C. H. Farr.*

4816. GUILLIERMOND, A. *Observation cytologique sur un Leptomitus et en particulier sur le mode de formation et la germination des zoospores.* [Cytological observations on a Leptomitus and especially the mode of formation and germination of its zoospores.] *Compt. Rend. Acad. Sci. Paris* 175: 377-379. *Fig. 1-6.* 1922.—This is a fungus found on dead fish. Figures and a description are given of mitochondria,—here observed in living condition for the first time in an aquatic fungus.—*C. H. Farr.*

4817. GUILLIERMOND, A. *Remarques sur la formation des chloroplastes dans le bourgeon d'Elodea canadensis.* [Remarks on the formation of chloroplasts in the bud of *Elodea canadensis.*] *Compt. Rend. Acad. Sci. Paris* 175: 283-286. *Fig. 1-11.* 1922.—Mitochondria and chondriocontes are described in the cells of the tissues studied. The author reaffirms his interpretation that there are 2 categories of chondriosomes, one having to do with photosynthesis; the function of the other is not known precisely.—*C. H. Farr.*

4818. HOGBEN, L. T. *A preliminary account of the spermatogenesis of Sphenodon.* *Jour. Roy. Microsc. Soc. London* 1921: 341-352. *Fig. 1-18.* 1921.—Five types of chromosomes are present, 26 being tentatively suggested as the diploid number. The possibility is offered that the 3 pairs with the sub-terminal fiber attachment are really pairs of paired chromosomes, thus giving 32 as the diploid number. The chromosomes of the different complexes correspond in size and shape. There are inconstant bodies (of nucleolar origin?) which pass with the chromosomes to the poles of the spindle. The parasynaptic view of chromosome origin is accepted and the stages described in this light.—*Wm. Randolph Taylor.*

4819. JEFFREY, E. C. *Professor Lloyd and vegetable crystals.* *Science* 57: 442-444. 1923.—This is a defense and reiteration of previous statements as to the manner of growth of druses in cells.—*C. J. Lyon.*

4820. KOZLOWSKI. *Critique de l'hypothese des chondriosomes.* [A criticism of the hypothesis of the chondriosomes.] *Rev. Gén. Bot.* 34: 641-658. *Pl. 11.* 1922.—In the cytoplasm of plant cells substances frequently occur in the form of droplets in suspension. One substance is in the form of very refractive, colorless droplets (lipoid droplets); another in the form of very small less refractive droplets (mitochondria). Mitochondria appear as more or less long series of pearls called chondriomites or chondriocontes; as spheres; or as amoeboid formations called plastids. The form of these agglomerations is dependent on the structure of the protoplasmic network. In the living cells, the granular structure of the chondriocontes, the chondriomites, and the plastids is readily discernable; in fixed and stained preparations this structure becomes less distinct,—even if the granular structure is not altered by the fixative, staining with haematoxylin effaces it. Investigators of fixed and stained tissues have frequently observed the chondriosomes as short rods or filaments and homogeneous globules differing in one dimension and have concluded that the small droplets elongate in the same direction and form in this way the homogeneous filaments. The latter transform themselves, so they say, by swelling, into plastids. A study of living tissues does not justify this hypothesis. Guillermond explains the granular structure of these formations, having studied them in living cells, as the result of an alteration of homogeneous filaments under the influence of water. This explanation is not justified because the granular structure of the chondriomites is very distinct in the living cells of aquatic plants that can be studied directly with the microscope. The hypothesis of the formation of plastids from chondriosomes, supported by Forenbacher, Lewitsky, Meves and Guillermond is justified, but the interpretation of the mechanism of this phenomenon does not correspond to the reality, according to the author. The plastids are formed by the agglomeration of droplets and not by their swelling. The hypothe-

sis of multiplication of chondriosomes and of plastids by division is incorrect. The dumb-bell form of chondriosomes and plastids is produced by the juxtaposition of 2 elements, not by their division. Finally, the author holds that the different hypotheses concerning the diverse physiological functions of the chondriosomes most frequently arise from preconceived ideas.—*J. C. Gilman.*

4821. KRAEMER, HENRY. **The starch grain.** *Science* 57: 175. 1923.—The author, stimulated by Sponsler's paper [see Bot. Absts. 12, Entry 4843], describes his own attempt to study the complex nature of the grain by treatment with aniline dyes, experiments which were once successful but which have never been repeated in spite of many trials.—*C. J. Lyon.*

4822. KULMATYCKI, W. J. **Bemerkungen über den Bau einiger Zellen von *Ascaris megalcephala* mit besonderer Berücksichtigung des sogenannten Chromidialapparates.** [Observations regarding the structure of certain cells of *Ascaris megalcephala*, with special consideration of the so-called chromidial apparatus.] *Arch. Zellf.* 16: 473-551. *Pl.* 22-26. 1922.—An account is given of the structure of the cells of the digestive tract, of the body wall muscles, and of the copulatory organs of *Ascaris megalcephala*, with special reference to the presence and nature of chromidia and the Golgi apparatus. "Chromidia" (the term is enclosed within quotation marks throughout the paper) are found in the flat epithelial-muscular cells of the oesophagus, in the subcutaneous and glandular cells of the rectum, in the pre-rectal dilator muscles, and in the muscles controlling the action of the copulatory spicules. None was found in the cells of the mid-gut, of the body wall muscles, or of the pre-rectal sphincter muscles. The "chromidia" vary in form; spherical ones are commonest in all cells, often strung together like a string of pearls. No evidence was found of the passage of material forming the "chromidia" from the nucleus. On the other hand, when stained by means of Benda's mitochondria method, they react exactly as do mitochondria. For this reason, and because of their general similarity in form and appearance, the author considers them to be closely related to mitochondria. He therefore rejects the term "chromidia," as applied to the structures observed in this genus, and calls them "Ascaridochondria." In the mid-gut cells, there are small spherical bodies surrounding the nucleus, which react to 2 per cent osmic acid and probably represent Golgi bodies. Their nature is not perfectly certain, owing to the absence of "ascaridochondria." In the subcutaneous cells of the spicular sheath, however, both "ascaridochondria" and Golgi bodies are present, the latter in the form of rods and spheres, evenly scattered throughout the cell. "Ascaridochondria" and Golgi bodies are probably unrelated structures.—*R. E. Cleland.*

4823. LENOIR, MAURICE. **La cinèse somatique dans la tige aérienne d'*Equisetum arvense* L.** [On the somatic mitosis in the aerial stem of *Equisetum arvense*.] *Compt. Rend. Acad. Sci. Paris* 174: 1559-1562. 1922.—A description is given of the nuclear condition in the interphase, prophase, metaphase, anaphase, and telophase. It is concluded that the fundamental substance of the chromosome is the nucleoline, called by other authors pyrenine or plastine, and that chromatin is a derivative.—*C. H. Farr.*

4824. LENOIR, MAURICE. **Les nucleoles pendant la prophase de la cinèse II du sac embryonnaire du *Fritillaria imperialis* L.** [The nucleoli during the prophase of the second division of the embryo sac of *Fritillaria imperialis*.] *Compt. Rend. Acad. Sci. Paris* 175: 985-987. 1922.—The substance of the nucleoli passes without apparent modification into a spirematic filament by a sort of aspiration. Between the beginning of this phenomenon and the formation of the chromosomes there is a period during which an equilibrium is established between the 2 chromatic substances, the chromatic network and the nucleoli.—*C. H. Farr.*

4825. LLOYD, FRANCIS E. **The cytology of vegetable crystals.** *Science* 57: 273-274. 1923.—The views of the writer are in opposition to those expressed by Jeffrey (*Science* 55: 566. 1922). Lloyd finds that druses in the cells of the buds of Ginkgo develop in the cytoplasm, grow, and crowd the nucleus and cytoplasm to the sides of the cell. More than one druse may

appear in a cell. The cell wall does not grow or change its shape to allow for the growth of the druse but actually seems to limit the shape of the druse. Conclusions from observations of conditions in Cactaceae, Orchidaceae, Iridaceae, and Begoniaceae are in harmony with those stated for *Ginkgo*.—*C. J. Lyon*.

4826. LUDFORD, R. J. **Contribution to the study of the oögenesis of *Patella*.** Jour. Roy. Microsc. Soc. London 1921: 1-14. *Pl. 1-2*. 1921.—The yolk forms under the influence of the Golgi bodies, and this proceeds until the egg is filled with spherical yolk bodies surrounded by Golgi elements. The layer of Golgi elements then breaks up and fragments form a layer under the vitelline membrane as well as around the nucleus. Nucleolar material is extruded into the cytoplasm. Mitochondria are present, but take no direct part in yolk formation.—*Wm. Randolph Taylor*.

4827. LUDFORD, R. J. **The behavior of the nucleolus during oögenesis, with special reference to the mollusc *Pattella*.** Jour. Roy. Microsc. Soc. London 1921: 121-133. *Pl. 3-4*. 1921.—During the transition from an undifferentiated cell of the germinal epithelium to an oocyte the cytoplasm changes from oxyphil to basophil, in which condition it remains until the time the Golgi elements have become scattered, when the oxyphilia increases again. The nucleolus has definite oxyphil and basophil parts, which usually separate into distinct spherical bodies. There is an extrusion of an oxyphil substance from the nucleolus during the differentiation of the nucleolus that may be related to yolk formation; the basophil part may be related to the condensation of the discrete chromosomes.—*Wm. Randolph Taylor*.

4828. LUDFORD, R. J. **The morphology and physiology of the nucleolus. Pt. 1. The nucleolus in the germ-cell cycle of the mollusc *Limnaea stagnalis*.** Jour. Roy. Microsc. Soc. London 1922: 113-150. *Pl. 3-5*. 1922.—The nucleus is lacking in the cells of the germinal epithelium, but in the development of an oocyte 1 appears that increases in size during development, performing amoeboid movements, with the extrusion of portions into the cytoplasm. A portion of the oxyphil nucleolus becomes basophil, which part persists till the end of oogenesis, when it breaks up and is distributed over the nuclear reticulum; the oxyphil part mostly passes out into the cytoplasm during oogenesis. In spermatogenesis an oxyphil nucleolus is present in the spermatocyte that persists until drawn into the massed reticulum in synesis, disappearing before diakinesis and not reappearing during the further stages in the maturation of the sperm. In the Sertoli (nurse-) cells of the ovatestis the nucleolus is characteristically enlarged. During nuclear fusion in fertilization the nucleoli seem to be absent. By the time of the late blastula stage an oxyphil nucleolus is again observable which disappears during each prophase and reappears at telophase. Mesoderm cells in the gastrula have especially large nucleoli. The cells of the adult in active metabolism have large nucleoli, the quiescent cells small ones.—*Wm. Randolph Taylor*.

4829. LYON, M. W., JR. **Acetone in tissue work.** Science 57: 444-445. 1923.—F. M. McFarland's observations [see Bot. Absts. 12, entry 194] on the successful use of acetone in place of alcohols for dehydrating tissues used for paraffin sections are confirmed. Pure acetone is used between xylene and water and may also be used as a solvent of such stains as eosin.—*C. J. Lyon*.

4830. MCKENZIE, G. A. **Methods used in animal histology.** Ann. Rept. Trans. Manchester Microsc. Soc. 1921: (Reprinted without change of page nos. from Lancashire and Cheshire Nat., June 1921, pp. 259-262). 1922.—Brief notes are given on fixatives (with formulae), the paraffin method, the celloidin method, and on staining with haematoxylin and Van Gieson's stain.—*C. E. Allen*.

4831. MARTENS, P. **Le cycle du chromosome somatique dans les phanérogames. I. *Paris quadrifolia* L.** [The cycle of the somatic chromosome in phanerogams. I. *Paris quadrifolia*.] La Cellule 32: 333-428. 4 pl. 1922.—The chromosome of *Paris quadrifolia* is at all

stages composed of 2 morphologically distinct constituents: a homogeneous achromatic matrix and a chromatic substance enclosed within it. In early prophase the chromatic constituent ("chromonematic element") lies peripherally in the matrix in the form of transverse or oblique curved strands; many of these are joined in the form of a zigzag thread, but they do not form a continuous spiral throughout the length of the chromosome. The chromosome elongates, the chromonematic element taking the form of a slender filament with the achromatic matrix condensed irregularly about it. As the chromosome again shortens and thickens, the matrix regains its regular lateral outlines and becomes a flattened ribbon. The zigzag chromonematic element now undergoes a "bilateral repartition": the chromatic substance flows from its transverse portions and collects at its angles along the margins of the ribbon, thus forming 2 lateral rows of swellings connected by the attenuated transverse portions. These swellings become somewhat elongated, and as the chromosome shortens further those in each row unite to form a continuous filament along the chromosome margin. The 2 marginal filaments are thrown into zigzags by the continued shortening of the chromosome. The achromatic ribbon then divides by a simple repartition into 2 longitudinal portions, completing the division of the chromosome, except for a few fine chromatic connections which remain until anaphase. The division of the chromosome does not involve a longitudinal cleavage of the slender chromatic filament, and it is not brought about by an alveolation: it occurs later, after the chromosome is somewhat shortened, by a bilateral repartition (not splitting) of the chromonematic element into 2 new zigzag filaments, this being followed by the division of the achromatic matrix. The slender chromatic filament of the prophase forms only a portion of the metaphase chromosome, and not all of it as some have supposed. In each daughter chromosome of the metaphase the chromonematic element occupies the periphery of the matrix except on the side toward the sister chromosome: each chromosome has a sort of bilateral symmetry, and the chromatic portions of the 2 may be likened to a pair of troughs facing each other. There is no continuous spireme, no transverse division of chromosomes, and no division of chromomeres.—During late prophase, metaphase, and anaphase, the achromatic matrix shows a pronounced chromaticity, which obscures the structure of the chromosome; this is probably due to an impregnation by the material of the nucleolus which disappears during these stages and reappears after the tassement polaire when the matrix again becomes achromatic.—In telophase the chromatic substance becomes arranged in 2 parallel masses in the chromosome, apparently along the edges of the chromatic "trough" seen at metaphase, thus establishing an actual duality within the chromosome. This duality is not the result of alveolation, and it does not represent the first stages of division, for it gradually disappears in late interphase or early prophase, leaving the chromatic matter in the form of a simple filament, which in later prophase gives rise to 2 daughter filaments by repartition. Chromosome division is therefore prophasic, and involves a repartition of both the chromonematic element and the achromatic matrix.—*L. W. Sharp.*

4832. MASCRÉ. Sur l'étamine des Borraginées. [The stamens of the Boraginaceae.] *Compt. Rend. Acad. Sci. Paris* 175: 987-989. 1922.—The following species were studied; all were found to be alike: *Symphytum officinale*, *Anchusa italica*, *Cynoglossum officinale*, *Borrago officinale*, *Echium vulgare*, *Pulmonaria officinalis*, *Cerithe major*. The formation of the partition separating the pollen chambers, the dissolution of the tapetum, the changes of the archesporial cells, and the transformation of the chondriosomes into chondriocones and plastids are described. As in the Solanaceae, the tapetum passes through 3 successive stages: differentiation; elaboration or secretion; and degeneration.—*C. H. Farr.*

4833. MASUI, KIYOSHI. The spermatogenesis of domestic mammals, I. The spermatogenesis of the horse (*Equus caballus*). *Jour. Coll. Imp. Univ. Agric. Tokyo* 3: 357-376. *Pl.* 11-13, *fig.* 1-2. 1910-1919.—Conjugation of the chromatin threads is by parasynapsis. The heterotypic division is followed by the homotypic. In the resulting 4 cells, 2 have 18 chromosomes and 2 have 19, 1 in each of the latter being the accessory chromosome. Mitochondria appear during the postsynaptic stages.—*E. R. Walker.*

4834. MASUI, KIYOSHI. **The spermatogenesis of domestic mammals, II. The spermatogenesis of cattle (*Bos taurus*).** Jour. Coll. Agric. Imp. Univ. Tokyo 3: 377-403. Pl. 14-16, fig. 1. 1910-1919.—Conjugation of the chromatin is probably by telosynapsis. The heterotypic division is followed by the homotypic. In the 4 resulting cells $\frac{1}{2}$ have 16 chromosomes and $\frac{1}{2}$ have 17, 1 being the accessory chromosome. Mitochondria appear abundantly during growth stages.—*E. R. Walker.*

4835. MEYER, ARTHUR. **Die "Hülle" der Chromatophoren.** [The "envelope" of the chromatophore.] Ber. Deutsch. Bot. Ges. 40: 161-167. 1 fig. 1922.—The outer region of the chromatophore was described by Senn (1908) as a "peristromium," which was thought to be concerned with the movement of the chromatophore. The writer is inclined to the view that this structure belongs to the slimy cytoplasm and that the latter is responsible for the movement of the chromatophore. The slimy cytoplasm is of one kind, but it may show different microscopical modifications. When "normal" it is very fluid and contains granules; when "metabolisiert" it is relatively firm and free from granules. The latter type surrounds the chromatophores giving a false impression of a differentiated part of the chromatophore.—*L. F. Randolph.*

4836. PARTINGTON, J. R., and D. B. HUNTINGBORD. **The reduction of osmic acids by lipoids.** Jour. Roy. Microsc. Soc. London 1921: 15-19. 1921.—"The substance formed by the reduction of osmic acid by olein in tissue staining was found to be a hydrated form of osmic dioxide, OsO_2 , and not metallic osmium, as has sometimes been stated."—*Wm. Randolph Taylor.*

4837. PISEK, A. **Chromosomenverhältnisse, Reduktionsteilung und Revision der Keimentwicklung der Mistel (*Viscum album*).** (Vorläufige Mitteilung.) [Chromosome relations, reduction division and revision of the embryogeny of the mistletoe (*Viscum album*). (Preliminary note.)] Ber. Deutsch. Bot. Ges. 40: 406-409. 1922.—In *Viscum album* the somatic chromosome number is 20, and a reduction to 10 occurs in both micro- and megasporogenesis. Normal fertilization takes place 10 days after pollination. A month later the endosperm begins to develop slowly, and after another month the fertilized egg divides. The species is amphimitic, the development of embryos by ovulate plants protected from insects reported by Heinricher being the result of wind pollination rather than apogamy.—*L. W. Sharp.*

4838. SÁNCHEZ Y SÁNCHEZ, MANUEL. **Sur la nature et la fonction de l'appareil réticulaire de Golgi.** [On the nature and function of the reticular apparatus of Golgi.] Compt. Rend. Acad. Sci. Paris 175: 1439-1440. 1922.—This study was made on the seed epidermal cells of *Faba vulgaris*. Argentophile granules are found. Infranuclear, perinuclear, and supranuclear trabeculae are present, confirming the earlier work by others on the presence of this apparatus in plant cells.—*C. H. Farr.*

4839. SCHRADER, FRANZ. **A study of the chromosomes in three species of *Pseudococcus*.** Arch. Zellf. 17: 45-62. Pl. 5-6. 1923.—The following were studied: *Pseudococcus nipae*, *P. maritimus*, and *P. citri* (order Homoptera, family Coccidae). The earliest phase of the growth period of the primary spermatocyte is characterized by the presence of a loose, delicate chromatin network, and, also, by a large deeply staining mass. From each of these, 5 chromosomes are organized. Those arising from the large mass are formed earlier, and tend to remain closely associated; those coming from the reticulum develop later, and lie loosely scattered around the others. When fully formed, all 10 chromosomes show a single longitudinal split. There is no pairing at this stage, and the 1st division is an equational division, not a reduction division. In anaphase, the 10 chromosomes passing to each pole are in 2 groups of 5 each. At the pole they are arranged as before, into 1 group of 5 closely associated chromosomes, and another of 5 loosely scattered ones. There is no regular interkinesis. In the 2nd spermatocyte division, reduction occurs, but apparently in an anomalous manner, the 2 groups of 5 being separated to different parts of the cell. This nuclear division is not followed by cyto-

plasmic division. Each cell is a double spermatid, and gives rise to 2 spermatozoa. No such anomalous behavior was observed during the maturation of the egg. It was not possible to tell, however, whether the female is homozygous for the massed, or for the loose group of chromosomes. In the somatic cells of the male, the clump of densely staining chromatin appears again, as well as the more lightly staining and flocculent network. Corresponding cells in the female show no clumping. It may be that the loose group of chromosomes lacks certain properties which would make them equivalent to the massed group. This lack may be indicative of a loss, or it may be that the group is in the way of disappearing, in which case the origin of haploid males is near solution. The female of *Pseudococcus* is homozygous, and the male heterozygous for sex.—*Ralph E. Cleland.*

4840. SCHÜRHOFF, P. N. Die Befruchtung von *Viscum album* L. [Fertilization in *Viscum album*.] Ber. Deutsch. Bot. Ges. 40: 314-316. Fig. 1-6. 1922.—The generative nucleus, while still in the pollen grain, divides after the pollen tube is formed. The 2 male nuclei and the vegetative nucleus then pass into the pollen tube.—*W. C. Muenscher.*

4841. SMITH, EDNA L. The histology of certain orchids with reference to mucilage secretion and crystal formation. Bull. Torrey Bot. Club 50: 1-16. Pl. 1. 1923.—Study of the floral organs of the orchids *Aspasia* sp. and of *Oncidium stipitatum* shows that mucilage cells are found in young actively growing regions and are associated with raphides. It is argued that mucilage originates in the protoplast, since the mucilage is separated from the cell wall by the thin layer of cytoplasm and the nucleus, which are in a living and active condition. The raphides are imbedded in the mucilage and separated from it by a sheath of different staining capacity. In *Polystachya minuta* and *Orchis spectabilis*, also, raphides and mucilage are found occurring together.—*P. A. Munz.*

4842. SPAUL, E. A. The gametogenesis of *Napa cinerea* (water scorpion). Jour. Roy. Microsc. Soc. London 1922: 231-242. Pl. 10-11. 1922.—The diploid complex for the male was 35, short rods with little size variation beyond 2 pairs of short chromosomes. The spireme forms the bouquet stage, followed by contraction to 1 pole. Later the diplotene filaments emerge from this, showing signs of cleavage. After the tetrad stage the chromosomes form the plate with 1 unpaired chromosome, which may precede the rest to the pole or lag behind. This is the "heterochromosome," which divides in the 2nd division. In the oogonia the diploid number was 36, so that this chromosome is there paired. The nucleolus seems to emit particles which take part in the formation of yolk.—*Wm. Randolph Taylor.*

4843. SPONSLER, O. L. The structure of the starch grain. Amer. Jour. Bot. 9: 471-492. 9 fig. 1922.—The problems presented by starch and various theories concerning the structure of the grain are discussed. These grains have been regarded by most investigators as sphere-crystals. By means of X-rays it is possible to determine whether a given powdered substance is amorphous or crystalline; and if the latter, its crystal system may be determined. This method of study consists in photographing the X-rays which are reflected from the various atomic planes of a crystal and produce definite lines. In describing this method, the modern conceptions of the crystal, the atom, and the X-rays are discussed. The author applied the method to a study of starch and describes in detail the apparatus used. This apparatus was tested by photographing with it crystals of sodium chloride, the structure of which is known. Definite lines were produced in photographs of this substance, but none by such an amorphous substance as dextrin. When studied thus, starch was found to produce definite lines on the photographic negative, thus resembling true crystalline structures. Ground and crushed starch grains, however, did not show these lines but behaved like an amorphous substance. If starch is truly crystalline such crushing should make no difference. Pulverized cane sugar, for example, gave results identical with the crystallized sugar. The author concludes that there is a regular and fairly uniform arrangement of atoms in the starch grain but that this regularity is destroyed by crushing the grain and hence cannot be that of a true crystal. The regularity of starch may not be that of planes but that of curved layers.—*E. W. Sinnott.*

4844. TAKAHASHI, NABUYOSHI. *Ueber Kernveränderungen in Ganglienzellen der Fische.* [Nuclear changes in the ganglion cells of fishes.] Arch. Zellf. 16: 463-472. Pl. 21. 1922.—In the central nervous system and spinal ganglia of a large number of fishes there is an invagination, or series of invaginations, in one side of the nuclear membrane. As a result the nuclei appear to be eaten out; in some cases roughly, in others smoothly. They may even become crescentic in shape. At times the chromatin of the nucleus is massed near this region, but not in all cases. This phenomenon seems to be restricted to the spinal sensory cells and to the sheath elements. It is still further localized, being found only in the largest cells, and in those which are packed into solid tissues; i.e., in cells which because of their size and compactness are unfavorably situated from the standpoint of respiratory and metabolic change. So far as studied all of the species of any one order of fishes reveal a like localization of this condition.—R. E. Cleland.

4845. T'SERCLAES, J. DE. *Le noyau et la division nucléaire dans le Cladophora glomerata.* [The nucleus and its division in *Cladophora glomerata*.] La Cellule 32: 313-326. 2 pl. 1922.—Nuclear division in *Cladophora glomerata* is similar to that of higher plants in chromosome behavior, but differs in its complete lack of an achromatic figure, as well as in the fact that the nuclear cavity remains clearly delimited throughout the entire process.—Material collected in winter and kept in running water at 12°C. in the laboratory showed most active nuclear division between 9 and 10 p.m. The resting nucleus has a delicate reticulum and 1 or more nucleoli. In prophase the reticulum becomes more chromatic and breaks up into reticulate elements, the chromosomes, which condense into separate slender threads—there is no continuous spireme. In some cases the chromosomes are more condensed from the first, as in higher plants with small chromosomes. In either case they eventually assume the form of short thick rods. In 1 nucleus 68 were counted. After shortening, the chromosomes split longitudinally, this being the first clearly described case of such splitting in green algae. There is no indication of chromomeres. The nucleus becomes lenticular in shape, and the split chromosomes group themselves variously about its major axis, not forming a regular equatorial plate as in forms having achromatic figures.—The nucleus elongates in the direction of its former shorter axis; its membrane remaining intact as the longitudinal halves of the chromosomes separate and pass toward opposite poles within it. Although the different chromosomes do not separate simultaneously, they form 2 distinct opposed groups at late anaphase. Meanwhile the principal nucleolus (other small ones have disappeared) elongates, stretches and breaks at the middle into 2 portions associated with the 2 chromosome groups. Occasionally the breaking up is more irregular, some nucleolar fragments being left in the cytoplasm between the 2 new nuclei, where they are later resorbed.—In telophase the chromosomes soon lose their parallel orientation, develop small openings, and become joined by connections arising through contacts to form a continuous reticulum, in which the chromosomes may be recognized as heavier strands. The nuclear cavity is now dumb-bell shaped, but just how the 2 new nuclear cavities are finally completed is uncertain; it is possible that the tubular connecting portion may sometimes constrict as other authors have described, but often the connection, with nucleolar fragments in it, is still visible after the cavities of the daughter nuclei are almost completely closed in.—L. W. Sharp.

4846. WAGNER, KARL. *Ueber die Entwicklung des Froscheies.* [The development of frogs' eggs.] Arch. Zellf. 17: 1-44. Pl. 1-4. 1923.—An extensive study was made of the development of the female germ cells of *Rana fusca* Roes., from the earliest appearance of oogonia until the formation of the polar bodies. Particular attention is given to the question of the continuity of the chromosomes during this period, and to the relation between the chromosomes and the nucleoli. The author, by a proper use of stains, traces the chromosomes entirely through the germinal vesicle stage. During this period the chromosomes, in form like a "cylindrical chimney brush," gradually lose both basi- and oxy-chromatin substances, and consist almost entirely of linin. Hence the failure of certain authors to observe them at this time. The principal conclusions reached are: (1) the chromosomes are demonstrable at all times during the period of egg development; (2) they are not derived from the nucleoli.—Ralph E. Cleland.

4847. WEISS, F. E. **Variations in the nuclear constitution of plants. Presidential address to the Manchester Microscopical Society.** Ann. Rept. and Trans. Manchester Microsc. Soc. 1921: (Reprinted without change of page nos. from Lancashire and Cheshire Nat., Mar.-Apr. 1922, p. 193-199). 1922.—A brief account is given of the present state of knowledge, with special reference to chromosome behavior. The author discusses the doubling of the chromosome number in gametic unions, chromosome reduction in *Spirogyra*, *Puccinia graminis*, ferns, and seed plants, the relation of chromosome number to mutation, the causes of changes in the number of chromosomes, and the relation of chromosomes to sexual differences.—C. E. Allen.

4848. WOLFF, CLARA. **Ueber konzentrische Strukturen im Eikern von Coleopteren. [Concentric structures in the egg nuclei of the Coleoptera.]** Arch. Zellf. 16: 443-462. Pl. 20, fig. 1-11. 1922.—The young oocytes were studied in the following beetles: *Sitodrepa panicea*, *Chlorophanus gibbosus*, *Calandra oryzae*, and *Niptus hololeucus*. Entire ovaries were dissected out in Koch's solution, and fixed in Petrunkevitch's, Carnoy's, Bouin's, and strong Flemming solutions. The inner central portion (Centralkörper) of the nucleus contains the chromatin. Surrounding this, and separated from it by a membrane, is a rather broad region (Binnenzone) which gradually enlarges and in which are formed successively a number of additional concentric membranes. Around this is formed a 3rd region (Randzone) containing a coarse network, and separated from the cytoplasm and from the Binnenzone by definite membranes. The mode of development of these regions differs in detail in the different animals. The author believes that the outer concentric regions belong to the nucleus since the membrane outside the periphery is firmer than the ones that separate the 3 regions from one another; also because in *Niptus* the central region and the Binnenzone are not separated from each other until a late period. The formation of the membranes is discussed, and compared to the formation of Liesegang's rings. They are considered to be precipitation membranes.—R. E. Cleland.

4849. WOODBURN, WILHAM LOGAN. **Spermatogenesis in *Asterella hemispherica*, Beam.** Ann. Botany 36: 535-540. Pl. 20. 1922.—Previous to the last division of the spermatogenous cells, 2 small dense cytoplasmic caps appear on opposite sides of the nucleus from which spindle fibers become organized. They are neither permanent cell structures nor are they centrosomes. The blepharoplast is first seen as a densely staining body on the inner surface of a membrane which develops between the nucleus and the boundary of the protoplast. The mature sperm consists of a curved, club-shaped part, the nucleus, tapering to a slender point which is continued by the thread-like blepharoplast bearing 2 cilia.—W. P. Thompson.

ECOLOGY AND PLANT GEOGRAPHY

GEORGE D. FULLER, *Editor*

(See also in this issue Entries 4781, 4967, 4989, 5008, 5009, 5026, 5031, 5032, 5037, 5101, 5110, 5112, 5168, 5194, 5228, 5232, 5236, 5266)

GENERAL, CONDITIONS, MEASUREMENTS

4850. ANONYMOUS. [REV. OF: BLOMEFIELD, L. **A naturalist's calendar, kept at Swaffham Bulbeck, Cambridgeshire.** 2d ed., edited by Sir FRANCIS DARWIN. xviii + 84 p. Cambridge University Press: London, 1922 (see Bot. Absts. 12, Entry 2301). Nature 111: 112. 1923.

4851. BATESON, W. **Area of distribution as a measure of evolutionary age.** [Rev. of: WILLIS, J. C. **Age and area: a study in geographical distribution and origin of species.** With chapters by HUGO DeVRIES, H. B. GUPPY, MRS. E. M. REID, and JAMES SMALL. x + 259 p. Cambridge University Press: London, 1922.] Nature 111: 39-43. 1923.—"Every evolutionist agrees that, apart from disturbing elements, area is a measure of age. * * * Unfortunately no means are suggested by which we may tell whether a species or genus is a novelty or a relic." The reviewer is very skeptical about the hypothesis, but believes the book serves an excellent purpose in renewing the debate on mode of evolution and in making geographical distribution a live study.—O. A. Stevens.

4852. HOLDEFLEISS, P. *Methodologische Bemerkungen zu "Die Trieblänge der Fichten und das Wetter."* [Methodological observations on "The twig length of spruce and the weather."] *Mitteil. Deutsch. Landw. Ges.* 38: 158. 1923.—The author arranges the figures given by C. Kassner [see Bot. Absts. 12, Entry 2995] to show that the spring rainfall has the greatest influence on growth of new shoots of spruce.—A. J. Pieters.

4853. HOWELL, A. BRAZIER. *Agencies which govern the distribution of life.* *Amer. Nat.* 56: 428-438. 1922.—Various types of life are considered. Active forms are aquatic, fossorial, terrestrial, arboreal, volant. In case of sedentary types (most plants) character of habitat and type of seed distribution are important. Direct physical barriers are discussed. Life zones are determined by latitude, altitude, proximity to sea, prevailing winds, extreme or delimiting temperatures, and mean temperature during reproductive period. Faunal regions are largely determined by humidity. Smaller associations are determined by local conditions and chemical and mechanical character of the soil. Food conditions are of great importance in determining distribution. Enemies also limit ranges. These are grouped as passive competitive forms, which are perhaps the more important, and active enemies, which may be simply irritating or actually exterminating.—P. W. Whiting.

4854. RUTHVEN, ALEXANDER G. *The opportunities for research on the Michigan biota provided by the Michigan Geological and Biological Survey.* *Rept. Michigan Acad. Sci.* 22: 105-115. *Pl.* 1-8. 1920.—The author discusses the types of surveys conducted by the Biological Survey on the fauna and flora of Michigan, with maps showing the portions of the state where such surveys have already been conducted.—Ernst A. Bessey.

STRUCTURE, BEHAVIOR, SYMBIOSIS

4855. CHAPMAN, H. W. *Aster tripolium* on salt marshes. *Nature* 111: 256. 1923.—Individuals of this species observed at Dovercourt on fields overflowed at every high tide were all fleshy and rayless, but on fields separated by dykes the plants were thin and wiry, with well developed rays.—O. A. Stevens.

4856. RICHTMYER, F. K. *The reflection of ultraviolet by flowers.* *Jour. Optical Soc. Amer. and Rev. Sci. Instruments* 7: 151-168. 8 fig. 1923.—The author used a small portable, quartz spectrograph giving a spectrum 1.6 cm. long from $\lambda = .30\mu$ to $\lambda = .50\mu$ to get on the same plate and under approximately the same conditions of day light illumination a spectrogram of magnesium oxide surface (arbitrary standard for comparison) and several spectrograms, of increasing length of exposure, of the flower in question, in daylight. The slit of the spectrograph was sufficiently narrow to resolve clearly the Fraunhofer lines, which served to identify wavelengths. The flower and spectrograph were protected from direct sunlight by white cloth 2 feet above the flower. Data were secured on the ultra-violet reflection of some 30 Colorado flowers and 1 yellow spider. The precision is apparently of the order of 10-20 per cent. The tentative conclusions drawn are: (1) Few flowers reflect any considerable proportion of ultraviolet. Of 25 flowers studied only 4 (*Laciniaria punctata*, *Onagra biennis*, *Rudbeckia laciniata*, and *Solanum rostratum*) reflect more than 10 per cent of radiation shorter than $.38\mu$. (2) Certain yellow flowers show a distinct ultraviolet reflection band; others show no trace of it. It is pointed out that if the human luminosity curve were extended proportionately toward shorter wave lengths so that it stopped at $.3\mu$ instead of at $.4\mu$, the color of *Rudbeckia* would be purple instead of yellow. (3) Flowers differ in reflection of ultraviolet as widely as in the reflection of the visible spectrum. Contrary to expectation, no white flower reflected more than 4 per cent of $\lambda = .39\mu$. (4) There seems to be no similarity in the ultraviolet reflection of closely related species.—J. R. Schramm.

4857. SEIFRIZ, WILLIAM. *The gregarious flowering of the orchid Dendrobium crumenatum.* *Amer. Jour. Bot.* 10: 32-37. 1923.—All individuals of this species within the same general locality, including plants of very different ages, flower simultaneously. This flowering is not rhythmic, the intermediate periods varying from a few days to several months. In confirma-

tion of the theory of Burkill from data obtained at the Straits Settlements, the author finds that precipitation at Buitenzorg is unusually heavy about the 8th day before flowering. He concludes that simultaneous flowering in this species is the expression of a heritable factor, but that the exact time at which it takes place is determined by some environmental condition—either heavy rainfall or the accompanying temperature change.—*E. W. Sinnott.*

4858. STEVENS, O. A. **An amateur wild flower bed.** *Amer. Midland Nat.* 8: 164-171. 1923.—This is an account of observations made on a wild flower bed in Fargo, North Dakota, which was given ordinary treatment and ordinary neglect. Over 50 species were planted or allowed to grow.—*Sister M. Ellen.*

VEGETATION

4859. BEAUVERD, G. **Herborisations de 1921.** [Field trips for the year 1921.] *Bull. Soc. Bot. Genève* 13: 20-29. 1921.

4860. BERNARD, CH. **Coup d'oeil sur la végétation des Indes Néerlandaises.** [A survey of the vegetation of the Dutch East Indies.] *Bull. Soc. Bot. Genève* 13: 9. 1921.

4861. CAMPBELL, DOUGLAS, HOUGHTON. **Australian botanical notes. I. Queensland and New South Wales.** *Amer. Jour. Bot.* 10: 38-56. 5 fig. 1923.—This is an account of the author's visit to Queensland and New South Wales in 1921. He discusses the topography and climate of the regions through which he passed, describes in general their vegetation, and presents notes on a large number of those species which are particularly conspicuous or otherwise interesting.—*E. W. Sinnott.*

4862. GUYOT, H. **Contribution phytogéographique sur le versant méridional des Alpes Pennines.** [A phytogeographic contribution for the southern slope of the Pennine Alps.] *Bull. Soc. Bot. Genève* 13: 185-216. 1921.—The character of the plants found in this region indicate that the valley of Valsorey has not been in intimate communication with the valley of Ollomont.—*W. H. Emig.*

4863. IRBY, L. G. **The redistribution and readjustment of tree life as it affects Australian and Tasmanian forestry.** *Proc. Australian Forest. Conference [Brisbane]* 1922: 58-61. 1922.—The geographical distribution of plants and some of the causes leading to limitations of natural distribution are discussed.—*C. F. Korstian.*

4864. PONCY, ROBERT. **Biologie et phénologie des marais de Sionnet.** [Notes on the biology of the bog at Sionnet.] *Bull. Soc. Bot. Genève* 13: 31-32. 1921.

4865. STEHLE, MABEL E. **Surface plankton protozoa from Lake Erie in the Put-in-Bay region.** *Ohio Jour. Sci.* 23: 41-54. Fig. 1-3. 1923.—The list of surface plankton protozoa includes 27 flagellates, 25 ciliates, and 14 rhizopods. The chlorophyll-bearing forms are thought to be present in greatest numbers at the surface between 3 and 5 p.m.—*H. D. Hooker, Jr.*

FLORISTICS

4866. BARBEY-CAMPERT, MME. **La flore des "Picos de Europa" (Espagne).** [The flora of the "top of Europe" (Spain).] *Bull. Soc. Bot. Genève* 13: 9-10. 1921.

4867. CHODAT, R. **La botanique en Italie d'après les monuments anciens.** [The flora of Italy in the vicinity of the ancient monuments.] *Bull. Soc. Bot. Genève* 13: 32-34. 1921.

4868. GUYOT, H. **Sur la flore du versant méridional des Alpes Pennines.** [The flora of the southern watershed of the Pennine Alps.] *Bull. Soc. Bot. Genève* 13: 17-18. 1921.—The xerophytic alpine flora in the valley of Ollomont reaches a higher altitude than the xero-

phytic flora in the valley of Valsorey. The area occupied by xerophytic plants is directly related to the distribution of *Pinus sylvestris*.—W. H. Emig.

4869. WILDEMAN, E. DE. *Les bambous en Afrique*. [Bamboos of Africa.] 36 p., 1 diagr. Extract from Congo. Rev. Gen. Colonie Belge. J. Goemaere: Brussels, 1921.—An examination of continental Africa leads to the conclusion that there is a definite relationship between the flora of the eastern part of the continent and that of Asia; this conclusion is supported by a study of bamboos. The following genera are recognized as indigenous to Africa: *Arundaria* Michaux, *Microcalamus* Franck, *Puelia* Franck, *Bambusa* Schreb., *Atractocarpa* Franck, *Oxytenanthera* Munro, *Oreobamboo* K. Schum., and *Guaduella* Franchet. Palaeontology gives no very definite evidence of the distribution of bamboos. The genera *Atractocarpa*, *Guaduella*, *Puella*, and *Oreobamboo* are apparently endemic but their affinities are far from well defined. In a general way it may be said that in the center and east of the continent tall bamboos dominate above rain forests at a relatively high altitude, rarely below 3,000 feet and often above 7,000 feet, frequently associated with certain types of conifers. The limits of the distribution of bamboos in Africa are given but the problems of bamboos in Africa are regarded as far from solution.—Henri Micheels.

APPLIED ECOLOGY

4870. BALDENSPERGER, PH. J. *Honey production in Egypt*. Amer. Bee Jour. 62: 418-419. 1922.—Honey is stored mainly in early spring from broad bean (*Vicia Faba*) and later from cotton and a variety of other plants.—J. H. Lovell.

4871. CARLING, A. *The hairy vetch*. Amer. Bee Jour. 62: 563. 1922.—*Vicia villosa* is a hardy biennial, enduring well weather that is hot and dry.—J. H. Lovell.

4872. COX, W. L. *Beekeeping in southwest Washington*. York's Bees and Honey 3¹⁰: 7-8. 1922.—Fireweed (*Epilobium angustifolium*) is the most important honey plant.—J. H. Lovell.

4873. DADANT, M. G. *Errors concerning honey-producing plants*. [Translation of: WUST, O. *Irtümer unserer Bienennährpflanzen*. Deutsche Illus. Bienenzeitg. 38: 86-88. 1921 (see Bot. Absts. 11, Entry 3647).] Amer. Bee Jour. 62: 266-267. 1922.—Plants with inconspicuous or green flowers are generally regarded as unattractive to bees, but many of them are good honey plants.—J. H. Lovell.

4874. DEMUTH, GEO. S. *Beekeeping and agriculture*. Gleanings in Bee Culture 50: 229-233. Fig. 1-4. 1922.—Notes are given on the pollination of coffee; buckwheat; alsike, red, and sweet clovers; and cotton.—J. H. Lovell.

4875. HENDRICKSON, A. H. *Wonder work of bees*. Gleanings in Bee Culture 50: 226-229. 1922.—Pollination of fruit-trees is popularly described.—J. H. Lovell.

4876. HOUSE, L. C. *Beekeepers look to "The Land of Honey."* Beekeepers Rev. 37: 5. 1922.—*Trifolium repens* and *T. hybridum* are so abundant in the Northern Peninsula of Michigan that this section is often called "Cloverland." Other common and valuable honey plants are dandelion, wild raspberry, and *Epilobium angustifolium*. An average of 50 pounds of honey per colony is easily obtained.—J. H. Lovell.

4877. KINDIG, B. F. *Nectar producing resources of Michigan*. Michigan Dept. Agric. Bull. 4. 19 p. 1922.—*Trifolium hybridum* and *T. repens* are the 2 chief sources of honey in Michigan, being especially well adapted to the low-lying heavy soils of the old lake bed. *T. hybridum* is extremely abundant in the northern part of the Lower Peninsula, and in the Upper Peninsula it covers thousands of acres with no bees to gather its nectar. A heavy growth of *Rubus idaeus* var. *aculeatissimus* follows the cutting of the hardwood forests, forming

almost impenetrable thickets. Its blooming period (about 2 weeks) precedes that of alsike clover. The honey is light in color and has a mild, excellent flavor. Following forest fires *Epilobium angustifolium* springs up in great abundance, and for several years yields a large surplus of fine water-white honey. In the northwestern counties of the Lower Peninsula *Asclepias syriaca* has extended over a large area; the honey is a very light amber color and has a rich fruity flavor. *Tilia americana*, formerly a major honey plant of the state, has become so rare that little basswood honey is produced. *Cirsium arvense* honey is stored in some localities yielding a white honey of very good flavor. The goldenrods (*Solidago rugosa*, *S. graminifolia*, etc.) are the most valuable sources of fall honey, furnishing a golden-yellow product with pronounced flavor. In the southern third of the Lower Peninsula *Bidens aristosa* is common in the swamps, and yields an amber-colored, strong-flavored honey.—Other honey plants of value are asters (*Aster multiflorus*, *A. vimineus*, *A. paniculatus*, etc.). *Verbena hastata*, *Mentha spicata*, *M. piperita*, *Acer rubrum*, *A. saccharum*, *Fagopyrum esculentum*, *Eupatorium perfoliatum*, cucumbers, and fruit bloom.—It is estimated that there are over 10,000 beekeepers in the state, and that 8,000,000 pounds of extracted honey and 2,000,000 pounds of comb honey are produced annually.—J. H. Lovell.

4878. KINDIG, B. F. The honey resources of Michigan. Amer. Bee Jour. 62: 545-547. Fig. 1-4. 1922.—*Trifolium hybridum* and *T. repens* grow together throughout the state but are most abundant on clay soils, particularly those once forming a part of the beds of lakes Huron and Superior. *Rubus idaeus* var. *aculeatissimus* is most common in the Upper Peninsula and in the Lower Peninsula north of a line drawn east and west through Cadillac. *Asclepias syriaca* is of value to the beekeeper in the northwestern part of the Lower Peninsula. There is a flow of light amber honey in the fall of the year which seems uniformly to have been overlooked. An average of 50 pounds or more per colony from goldenrods, Spanish needles, bone-set, buckwheat, purple vervain, and asters is not uncommon.—J. H. Lovell.

4879. LATHAM, C. J. Wild cucumber a honey plant. Gleanings in Bee Culture 50: 595. 1922.—*Echinocystis lobata* blooms 4-5 weeks and yields a light amber honey, which is very thick and of excellent flavor.—J. H. Lovell.

4880. MABBOTT, D. C. Food habits of seven species of American shoal-water ducks. U. S. Dept. Agric. Bull. 862. 67 p. 1920.—The vegetable food of these ducks consists mainly of species of *Niadaceae*, *Gramineae*, *Cyperaceae*, *Polygonaceae*, *Sparganiaceae*, *Nymphaeaceae*, *Rubiaceae*, *Compositae*, algae, and a few representatives of other shore or water plants.—Julia M. Haber.

4881. McATEE, W. L. Waterfowl and their food plants in the sandhill region of Nebraska. U. S. Dept. Agric. Bull. 794. 37-77. 1920.—The sago pondweed, *Potamogeton pectinatus* and wild rice, *Zizania palustris*, form the best duck food.—Julia M. Haber.

4882. MERRILL, J. H. Honey plants of Kansas. Amer. Bee. Jour. 62: 7-10. Fig. 1-4. 1922.—Kansas may be divided into 4 sections according to its honey plants and beekeeping conditions. In the northeast corner the rainfall ranges from 33 to 43 inches. The soil along the Missouri River consists of loess which is well adapted to fruit growing. In the western portion of this section the soils are glacial. This is the only part of the state in which *Trifolium repens* is valuable, but nectar secretion varies greatly in amount in different seasons. *T. hybridum* is not largely grown. *Melilotus alba* is nearly equal to white clover. Other honey plants are *Taraxacum officinale*, *Acer saccharinum*, *Tilia americana*, *Bidens aristosa*, and *Polygonum Persicaria*.—The soils in the southeast corner are derived from shale and are too acid for leguminous plants. The important honey plants are *Bidens aristosa*, *Melilotus alba*, *Polygonum Persicaria*, and *Solidago*. *Disopyros virginiana* furnishes early pollen and nectar.—The central part or the state lies between the altitude of 1000 feet on the east and 2000 feet on the west. The rainfall ranges between 21 and 31 inches. The soils are derived from sandstone, limestone, and shale. Beekeeping conditions are very favorable in the valleys of the

Arkansas, Kaw, Blue, Verdigris, and Solomon rivers. The most important honey plants are *Melilotus alba*, *Medicago sativa*, *Polygonum Persicaria*, and *Taraxacum*. *Monarda punctata* is abundant in the Arkansas River Valley; it has yielded 4 good honey crops in 10 years and averaged 100-150 pounds. The western section varies in altitude from 2000 to over 3000 feet; popularly it is known as the "short-grass region." The soils contain a high percentage of lime. *Cleome serrulata* grows in profusion and is a valuable honey plant. Alfalfa and sweet clover are the principal crops.—J. H. Lovell.

4883. PARK, WALLACE. **Time and labor factors involved in gathering pollen and nectar.** Amer. Bee. Jour. 62: 254-255. Fig. 1-2. 1922.—During the period of observation in 1920 and 1921 average colonies of bees stored respectively about 5 and a little over 1 pounds per day from *Melilotus alba*. In the 1st instance weather conditions were highly favorable; in the 2nd, mediocre to poor.—The maximum number of trips recorded in 1 day for a nectar carrying bee was 24 in 1920, and 17 in 1921. The average number of trips per day was $13\frac{1}{2}$ in 1920, and 7 in 1921. The average time per day spent in nectar-carrying, in 1920, was $8\frac{1}{2}$ hours, and, in 1921, $7\frac{1}{2}$ hours.—The maximum number of trips made per day by a bee gathering pollen from corn was 20, in 1920; in 1921, only 11. The averages were about 8 and $5\frac{1}{2}$ trips per day for the respective years. As a rule corn pollen was not available in the afternoon; the above figures therefore represent only about $\frac{1}{2}$ day in actual time.—The average minimum flying weight of an Italian bee is approximately 82 mgm. Maximum loads of nectar weighed nearly 70 mgm.; average loads, about 40 mgm. A maximum load of pollen weighed about $\frac{1}{2}$ of the weight of the bee, and less than $\frac{1}{2}$ that of a maximum load of nectar.—J. H. Lovell.

4884. PARKS, H. B. **The American hollies as honey yielders.** Beekeepers' Item 6: 9-10. 1922.—*Ilex opaca* extends from Massachusetts to Texas. Where abundant it yields well, and in some localities is the chief source of surplus. The honey is nearly white and has a mild flavor. Yaupon (*I. vomitoria*) and dahoon (*I. Cassine*) yield a very large amount of honey in the swamplands of the central South. The honey is amber-colored and has a peculiar flavor. It does not granulate quickly. Gallberry (*I. glabra*) and swamp gallberry (*I. decidua*) form immense thickets in the lowlands along the Atlantic and Gulf coasts. They bloom from May to June and yield an immense amount of honey. The average surplus stored per colony is usually 35-40 pounds, but a colony has been known to gather 150 pounds. The honey is light amber, very heavy, has a mild flavor, and does not granulate.—J. H. Lovell.

4885. PELLETT, F. C. **Honey regions of Iowa.** Amer. Bee Jour. 62: 453-455. Fig. 1-3. 1922.—The surface, climate, and soils of the state are briefly described. *Trifolium repens* is the main source of surplus honey in nearly every county. In every 5 years there is likely to be 1 big crop, 2 fair crops, 1 light crop, and 1 failure. *T. hybridum* is important in a few counties. The floral tubes of *T. pratense* are so long that, except under unusual conditions, it is not a valuable honey plant. The area of *Melilotus alba* is rapidly extending. In woodlands *Symphoricarpos orbiculatus* and *S. racemosus* yield a surplus in mid-summer. Other honey plants are heartsease, Spanish needle, willows, maples, dandelion, asters, and fruit-trees.—J. H. Lovell.

4886. PELLETT, F. C. **Prickly comfrey.** Amer. Bee Jour. 62: 109. Fig. 1. 1922.—*Symphytum asperrium* yields perhaps as large amounts of forage as any plant known. The bloom is attractive to bees, but there is no information available as to the amount of honey procurable from it.—J. H. Lovell.

4887. PELLETT, F. C. **The annual sweet clover.** Amer. Bee Jour. 62: 95-97. Fig. 1-5. 1922.—Annual or Hubam sweet clover (*Melilotus alba* var.) can be used in a 2-year rotation. While the Hubam is better for a catch crop, the biennial is apparently better in fields, when it is desired to grow sweet clover for a series of years. Hubam clover offers a long honey flow, and each acre of this plant, it is believed, will support 1 colony of bees.—J. H. Lovell.

4888. PHILLIPS, E. F., and G. S. DEMUTH. **Beekeeping in the buckwheat region.** U. S. Dept. Agric. Farmer's Bull. 1216. 26 p., 6 fig. 1922.—The buckwheat beekeeping region includes New York, Pennsylvania, northeastern Ohio, western Maryland, and West Virginia; $\frac{2}{3}$ of the entire buckwheat area in the U. S. A. is in New York and Pennsylvania. In New York buckwheat yields nectar freely during the forenoon: the flow ceases early in the afternoon. Secretion is reduced or stopped when the temperature falls below 70°F. It is most abundant when the nights are cool and the days warm and calm. Early bloom or late bloom secretes little, or not at all. In the glaciated plateau region of New York and Pennsylvania nectar is secreted best on the Volusia and DeKalb soils, formed by the disintegration of shale and limestone. The honey is dark colored and strong flavored. Only extracted buckwheat honey should be produced.—As buckwheat secretes nectar so late in the summer, the colonies of bees under proper care are likely to reach maximum strength before the nectar is available. A system of management is required which will result in a full honey crop and at the same time control European foulbrood, which is very prevalent in the buckwheat region.—*J. H. Lovell.*

4889. PHILLIPS, E. F., and G. S. DEMUTH. **Beekeeping in the clover region.** U. S. Dept. Agric. Farmers' Bull. 1215. 27 p., 7 fig. 1922.—The clovers doubtless furnish more honey than any other genus of plants. The best clover honey region in the U. S. A. lies in western Vermont, northern and central New York, northwestern Ohio, northern Indiana, and Illinois, Michigan, Wisconsin, Minnesota, and northeastern Iowa. The quantity of nectar secreted varies enormously according to soils, climatic conditions, and other environmental factors. The chief blooming period of *Trifolium repens* begins in the spring about 5 or 6 weeks after the last killing frost and lasts 3-5 weeks. Nectar secretion is not uniform throughout the range of this species. The plants thrive best in localities with ample rains in July, August, and September. Abundant rain in May prolongs the period of blooming and of nectar secretion. White clover is a major source of honey only where the soils are calcareous and the average summer temperature not above 75°F. Secretion is most rapid under a considerable daily range temperature,—night temperature below 65°F. and day temperature above this point. *T. hybridum*, unlike white clover, is regularly cultivated as a farm crop. The conditions controlling nectar secretion are essentially the same as in white clover. *T. pratense* is losing ground as a farm crop because of the increasing deficiency of lime in the soils. It does not thrive in cold wet land. As is well known the flowers of red clover secrete nectar more freely than do those of white clover or alsike clover. Under normal conditions the floral tube of red clover is much longer than the tongue of the honey-bee. Honey is secured from the bloom only when the floral tubes are shortened by drought, or, owing to very favorable conditions of soil and climate, nectar is secreted so abundantly that it rises in the tubes until a part of it becomes accessible to the honey-bee.—Many beekeepers in this region are failing to obtain the full available honey crop because of deficiencies in their practice of bee culture. A system of management is given promising full crops.—*J. H. Lovell.*

4890. PHILLIPS, E. F., and G. S. DEMUTH. **Beekeeping in the tulip-tree region.** U. S. Dept. Agric. Farmers' Bull. 1222. 25 p., 6 fig. 1922.—A method is given for the management of apiaries to secure full honey crops from *Liriodendron tulipifera*. The tulip-tree region is restricted largely to Tennessee, Kentucky, the western portion of the Carolinas and Virginia, the Piedmont Plateau of Maryland, West Virginia and the Ohio River Valley. Although the bloom is a most dependable source of nectar, not much honey is at present secured from it (2.8 per cent of the total U. S. A. crop). The flowers open about 3 weeks after the average date of the last killing frost, and the blooming period lasts about 2 weeks. Trees begin to bloom when 15 years old. The honey is dark amber in color and has a strong flavor. Extracted honey alone should be produced from this source. Complete directions for the proper care of bees in this region are given.—*J. H. Lovell.*

4891. SCHMID, SEPP. **Beekeeping in Austria.** Amer. Bee Jour. 62: 512. Fig. 1. 1922.—Austria with a population of 6,400,000 and a territory of 32,000 square miles has about 60,000 beekeepers. In 1921, 350,000 colonies produced 1,320,000 pounds of honey, and 286,000 pounds

of wax. In the fine honey locations of Marchfeld, Under-Carinthia, and Burgenland 100 pounds of honey per colony is often obtained in good years.—The common honey plants are acacia, basswood, maples, brambles, esparcette, white clover, heather, buckwheat, and golden-rod.—*J. H. Lovell.*

4892. SHEPPARD, W. J. The Siberian yellow-flowered alfalfa. *Amer. Bee. Jour.* 62: 420-421. 1922.—*Medicago falcata* is a good honey and forage plant, and well adapted to the dry belt of the interior of British Columbia.—*J. H. Lovell.*

4893. SHEPPARD, W. J. The spreading dogbane is a good honey plant. *Agric. Jour.* [British Columbia] 7: 252. 1923.—The honey from *Apocynum androsaemifolium* L. is water white and cannot be distinguished from that from fireweed by its color, but is better flavored and usually denser.—*J. W. Eastham.*

4894. SHEPPARD, W. J. The spreading dogbane is a good honey plant. *Amer. Bee Jour.* 62: 562-563. 1922.—[See preceding abstract.]

4895. SHEPPARD, W. J. Hairy vetch as a honey plant. *York's Bees and Honey* 3^o: 8-9. 1922.—In many orchards of British Columbia, *Vicia villosa* used as a cover crop is a good honey plant. The pale amber honey is secured in June and July.—*J. H. Lovell.*

4896. SHEPPARD, W. J. The hairy vetch as a honey plant. *Amer. Bee Jour.* 62: 455. 1922.—[See preceding abstract.]

4897. SMITH, B. F. Quality of honey influenced by soil. *Amer. Bee Jour.* 62: 31. 1922.

4898. SWENK, M. H. The honey regions and honey plant of Nebraska. *Amer. Bee Jour.* 62: 197-201. *Fig. 1-4.* 1922.—Nebraska is divided by the author into an eastern or white clover region and a western or alfalfa region. The dividing line runs irregularly through Holt, Boone, Garfield, Custer, Lincoln, and Hitchcock counties. East of this line the soil is loess, west of it sandy loams, or sand. The fertile loess is a comparatively moist soil, and the plants of this section are mesophytes or hydrophytes; on the sandy semi-arid western soils the plants are xerophytes. The annual rainfall in the eastern portion of the state ranges from 30 to 32 inches; in the western portion, from 12 to 15.—The chief sources of nectar in the eastern region are *Trifolium repens*, *Acer saccharinum*, *Taraxacum officinale*, *Robinia Pseudacacia*, *Gleditsia triacanthos*, *Catalpa speciosa*, *Asclepias syriaca*, *Brassica nigra*, *Cassia fasciculata*, *Helianthus annuus*, *Polygonum Persicaria*, and others. To the honey flora of the western region belong *Medicago sativa*, *Ribes setosa*, *Cleome serrulata*, *Cleomella angustifolia*, *Gaura coccinea*, *Orcocarya suffruticosa*, and many species of *Bidens*, *Aster*, *Solidago*, and *Helianthus*.—A number of honey plants are widely distributed throughout the state. Probably white sweet clover and yellow sweet clover yield a larger surplus than any other 2 species.—*J. H. Lovell.*

4899. VORGHESEANI, G. A. R. L'ecologia vegetale e le sue applicazioni. [Vegetable ecology and its application.] *Riv. Biol. Rome.* 4: 521-534. 1 *pl.* 1922.

4900. WETMORE, A. Wild ducks and duck foods of the Bear River marshes, Utah. *U. S. Dept. Agric. Bull.* 936. 20 *p.*, 4 *pl.* 1921.—Of foods attractive to 11 species of ducks found in the Bear River marshes, *Potamogeton pectinatus* and *Scirpus paludosus*, both occurring in abundance, furnish a large part of the vegetable portion. In all, 49 plants were available as duck foods.—*Julia M. Haber.*

4901. WILDER, J. J. Red bay as a honey plant. *Dixie Beekeeper* 4^o: 10. *Fig. 1-2.* 1922.—*Persea bordonia* grows in swamps near the coast from Virginia to Texas. The small flowers yield abundantly a very thick nectar from March to May. The honey is dark, strong in flavor, and is sold as grade No. 2. In the low Coastal Plains the honey never granulates although very thick.—*J. H. Lovell.*

4902. WILDER, J. J. **St. Mary's River.** Dixie Beekeeper 41: 4-6. Fig. 1. 1922.—The rich, swampy land along the river is covered with a dense growth of *Nyssa aquatica*, one of the best honey plants of this section, and *N. biflora*. *Serrenoa serulata*, *Acer rubrum* and *Ilex glabra* are also common. This territory would support an immense number of colonies of bees, and could be stocked either by land or water transportation.—J. H. Lovell.

4903. WINKLER, E. A. **How Hubam clover increased my honey crop.** Amer. Bee Jour. 62: 556. 1922.

4904. YOUNG, FLOYD D. **Influence of cover crops on orchard temperatures.** Monthly Weather Rev. 50: 521-526. Fig. 1-8. 1922.—A cover crop has little effect on temperature a few feet from the ground. Because of the shading there is a cooling effect upon the soil which tends to decrease the temperature and therefore to increase the possibility of frost.—E. N. Munns.

FOREST BOTANY AND FORESTRY

W. N. SPARHAWK, *Editor*

(See in this issue Entries 4863, 5135, 5142, 5154, 5236, 5240, 5266)

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 4718, 4730, 4738, 4780, 4809, 4813, 4820, 4831, 4833, 4834, 4839, 4846, 4847, 4851, 4857, 4999, 5002, 5004, 5007, 5020, 5021, 5024, 5033, 5034, 5036, 5122, 5232)

4905. ANONYMOUS. **Biological terminology.** Nature 109: 733-736. 1922.—Scientific terms persist but their content requires continual readjustment. Vagueness occurs because biologists are not disciplined in methodology and the art of formulation. A term like "acquired character" is used by competent biologists in the same sense but it might be better to drop it in favor of some term like "somatic modification." Distinction between hereditary characters and modifications has been criticized. The relation between hereditary factors and environment is pointed out and the nature of new hereditary characters is discussed. The important point is not what terms are used but that biologists understand one another. Although inheritance depends upon factors, it is not necessary always to mention hereditary factors rather than hereditary characters. Concerning acquired characters more facts are needed and critical interpretation rather than discussion of terminology. The mistake of making an antithesis between "nature" and "nurture,"—2 components of 1 resultant—is not one to which a biologist can plead guilty.—Walter Scott Malloch.

4906. ÅKERMAN, Å. **Beiträge zur Kenntnis der Speltoidmutationen des Weizens. I. Untersuchungen über eine Speltoidform aus schwedischem Sammetweizen.** [Studies on speltoid mutations in wheat. I. Investigations on a speltoid form of Swedish velvet wheat.] Hereditas 4: 111-124. 2 fig. 1923.—An abnormal plant produced 9 offspring like the normal variety type, 4 like the abnormal parent plant, and 1 weak, small, bearded speltoid type plant. The 4 proved to be heterozygous and the 1 homozygous, with regard to the speltoid character. The homozygous speltoid type plant was shorter than the normal or heterozygote, and the head was more lax. With respect to shape, size, and pubescence of glume, and size and endosperm character of grain, the heterozygote form is between the normal and the speltoid. The heterozygote produced normals, heterozygotes, and speltoids in the ratio of 1.75 : 2.02 : 0.23 instead of the usual 1 : 2 : 1. This corresponds to Nilsson-Ehle's speltoid type A, the heterozygotes equalling the sum of the 2 homozygotes. This result is evidently brought about by the elimination of ♂ speltoid gametes. This is evidenced by certain crosses. Normal type ♀ × heterozygote ♂ produced 126 normals and 22 heterozygotes. The reciprocal cross gave the normal ratio of 1 : 1. It is assumed further that the amount of ♂ gamete

elimination is a variable factor directly correlated with the vitality of the speltoid soma. A variant heterozygote speltoid is described corresponding to Nilsson-Ehle's type B with a ratio of normals to heterozygotes of approximately 1:3 with only an occasional homozygous bearded speltoid appearing. This arose in this experiment from a plant of type A, already described.—*L. R. Waldron.*

4907. APPEL, O. *Über die Anfälligkeit und Widerstandsfähigkeit verschiedener Kartoffelsorten gegen Krebs.* [Susceptibility and resistance of different potato varieties to wart.] Arbeit. Ges. Förderung Baues u. Verwendung Kartoffeln 15. 19 p., 1 pl. 1918.—The author recalls the unpromising results of soil treatment for protection against wart and emphasizes the value of resistant varieties. His summary of varieties tested shows many more susceptible than immune. No connection is evident between time needed for maturing and susceptibility. Experiments point to inheritance of susceptibility. The hybrid character of potato stocks makes genetical interpretation difficult. A study of varietal pedigrees reveals such facts as the following: of 6 varieties descended from the crossing of Jubel and Deutsches Reich 4 were more or less resistant and 2 susceptible. Jubel is wart-resistant while the reaction of the other parent is unknown. Hindenburg (resistant) and Laurus (susceptible) arose from Jubel and 2 susceptible varieties as parents. Fürst Bismarck (susceptible) has given rise to 2 named resistant varieties, the other parents of which were untested. An extensive list of potato varieties is given in which the varieties are grouped into non-susceptible, slightly susceptible, strongly susceptible, and very strongly susceptible.—*J. P. Kelly.*

4908. BAILEY, VERNON. *Beaver farming.* Jour. Heredity 13: 215-218. 5 fig. 1922. [1923].—This is an untouched field of investigation, and great diversity exists in the various wild races of beavers.—*R. C. Cook.*

4909. BECKER, J. *Über vegetative Bastardspaltung.* [Somatic or vegetative segregation.] Zeitschr. Pflanzenzücht. 8: 402-420. 2 fig. 1922.—Somatic modification of factors is apparent only when the changed cell becomes the mother cell of a lateral bud, flower, leaf, etc. The writer believes it occurs many times but remains hidden. Vegetative segregation has been observed in carnations, snapdragons, tulips, wheat, poppy, dahlia, *Vicia villosa*, lupine, peas, beans, barley, oats, azalea, Pelargonium, asters, *Scabiosa*, *Dianthus*, *Petunia*, *Campanula*, *Aquilegia*, *Verbena*, and some fruits such as pears, grapes and tomatoes.—Fruwirth was the earliest worker in the field; E. v. Tschermak and Baur also report somatic segregation. It is variously regarded as mutation, bud variation, and xenia. Becker's classification shows all gradations from recessive to dominant occurring in cases of somatic segregation.—Intensified environmental conditions are reported as causing somatic segregation or mutations. Becker attributes all cases fundamentally to an unequal division of the nucleus.—*Helen D. Hill.*

4910. BLUHM, AGNES. German rev. of: KOSTITSH, ALEXANDRE. (1) *Sur la dissociation de la glande séminale et de la glande interstitielle déterminée par l'alcoolisme expérimental. Stérilité sans impuissance.* (The dissociation of the seminal gland and the interstitial gland caused by experimental alcoholism. Sterility without impotence.) Compt. Rend. Soc. Biol. 84: 569-571. 1921. (2) *Sur l'involution du processus spermatogénétique provoquée par l'alcoolisme expérimental.* (The involution of the spermatogenetic processes provoked by experimental alcoholism.) Ibid. 84: 674. 1921.] Arch. f. Rass.- u. Ges. Biol. 14: 188. 1922.

4911. BLUHM, AGNES. [German rev. of: MACDOWELL, E. CARLETON. (1) *Alcohol and white rats. A study of fertility.* Proc. Soc. Exp. Biol. and Med. 19: 69-71. 1921. (2) *The action of alcohol upon germinal material.* [Abstract.] Anat. Rec. 23: 92. 1922 (see Bot. Absts. 11, Entry 1393).] Arch. Rass.- u. Ges. Biol. 14: 357-360. 1922.

4912. BLUHM, AGNES. [German rev. of: PEARL R. *The experimental modification of germ-cells.* Jour. Exp. Zool. 22: 125-186, 241-310. 1917.] Arch. Rass.- u. Ges. Biol. 14: 355-356. 1922.

4913. BONNIER, GERT. *Studies on high and low non-disjunction in Drosophila melanogaster*. *Hereditas* 4: 81-110. 2 fig. 1923.—Bridges had found that females having 1 Y and 2 X chromosomes give exceptions to the usual scheme of sex linkage, owing to synapsis of an X with the Y and subsequent non-disjunction of the 2 X's, in about 4 per cent of the reduction divisions, but in 1 such non-disjunctive line he found the XXY females to give 21 per cent of exceptions. Bonnier finds that the high per cent of X-Y synapsis in this line depends upon something that must be present in both the X chromosomes of the XXY female of the "high line," and not upon anything elsewhere located, since XXY descendants of outcrosses of the high line, which had received 1 of their X's from another line, always showed the low percentage, whereas XXY descendants which had received both X's from the high line but often the Y and some autosomal material from other lines invariably showed the high percentage. When, through outcrosses involving crossing-over, XXY flies were made up in which only the left ends of the X chromosomes of the high line were represented in both of their X's (neglecting whatever derivative of the high line might be present in only 1 of the X's), an intermediate proportion of exceptions (8 to 13 per cent) was obtained; in 1 such case only that portion of both X's to the left of cut (locus about 20) was derived from the high line. When only the right end of both X's came from the high line (in an extreme case only apart to the right of vermillion, locus 33), there was also an intermediate per cent—10.6 to 15.5. Therefore, the high original per cent (21) is not dependent on 1 pair of genes, but either on 2 or more,—or, as Bonnier believes, on some peculiarity of the entire length of the chromosome, resident in what he calls the "genebasis" in distinction to the genes themselves. On this hypothesis the length of "genebasis" ("z"), common to both chromosomes, that was derived from the high line, determines the percentage of exceptions ("y"). Bonnier calculates that, accepting this supposition and taking his data at their face value, and neglecting the great variability in percentage between different supposedly genetically identical cultures, the following empirical formula holds: $y = 4.3 + 0.2 z$.—H. J. Muller.

4914. BREITENBECHER, J. K. *Hereditary shortness of thumbs*. *Jour. Heredity* 14: 15-22. 5 fig. 1923.—Hereditary shortness of thumbs is a unique human abnormality, not previously described, discovered about 10 years ago. The abnormal trait is associated with a long narrow hand; but the most evident feature is a thick, short, broad thumb. Briefly, the abnormal thumb is shorter than the normal by the length of the 1st phalanx. In the family under observation the writer traced this abnormal thumb through 5 generations, 13 members having it. The character is neither sex-limited nor sex-linked in its transmission. The evidence proves that it is an autosomal Mendelian dominant.—J. K. Breitenbecher.

4915. BROWN, W. R. *Pusht-i-Kuh × Hashtnagari sheep at the agricultural experiment station, Peshawar*. *Agric. Jour. India* 17: 264-270. 3 pl. 1922.—The author describes the results of crosses made in the Northwest Frontier Province of India between a Pusht-i-Kuh or long-wooled Persian ram, obtained on the Tigris, with native ewes of a closely similar breed, the Hashtnagari. Efforts to make matings with fat tailed Peshawari ewes were unsuccessful. Both the Pusht-i-Kuh and the Hashtnagari are fat tailed sheep but the former has a much broader and more massive tail. Both carry a heavy fleece of good carpet wool quality. The Pusht-i-Kuh is a much heavier sheep. The crossbreds showed marked improvement in rate of maturity, in live and dead weight, and in the quality and weight of the fleece. The rams exceed even the Pusht-i-Kuh in weight and constitution. It is suggested that this is an effect of crossing.—Sewall Wright.

4916. COLE, LEON J., and DEWEY G. STEELE. *A waltzing rabbit*. *Jour. Heredity* 13: 290-294. 1 fig. 1922 [1923].—A rabbit which exhibited circular movements similar to those of waltzing mice and rats occurred among the descendants of males treated experimentally with lead and with alcohol. Several other nervously defective individuals cropped out in the same line of descent, and it is possible that all may have been induced by the effects of the poisoning on the germ plasm. Simple Mendelian inheritance of the waltzing behavior, as it occurs in mice, could not be demonstrated in the rabbit.—L. J. Cole.

4917. COLIN, HENRI, et Y. TROUARD-RIOLLE. **Dissociation de l'hybride: orge noire à barbes lisses × orge Albert.** [Hybrid segregation: Black Bearded Barley × Albert.] *Compt. Rend. Acad. Sci. Paris* 176: 854-856. 1923.—A black barley with awns smooth except at the extremity was pollinated by Albert, a homozygous, white, rough-awned barley. Of the 20 "hybrid" kernels secured, 14 were germinated. Black kernel color is dominant, though many less well developed kernels are merely grayish and the awns range all the way from black to white. The authors report that the F_1 population includes smooth-awned, rough-awned, and intermediate forms and that smooth-awned F_1 plants gave rise to only smooth-awned F_2 plants. The rough-awned plants are reported to have a segregating F_2 progeny, but no numerical data are given for the segregating classes. The authors claim that "disjunction of characters" occurred in F_1 , without mentioning the possibility of self pollination.—*Kwen S. Hor.*

4918. COLLINS, J. L. **Culture of Crepis for genetic investigations.** *Jour. Heredity* 13: 329-336. 4 fig. 1922 [1923].—The paper describes cultural and hybridization methods used in studying inheritance in a genus of the Compositae. Achenes may be sprouted in shallow pans of sterilized soil or in a glass jar-moist chamber germinator. Advantages of each are given. Achenes may be sterilized with formaldehyde vapor or a solution of calcium hypochlorite to prevent growth of injurious fungi. The young seedlings are sub-irrigated in pots. Hybridization is accomplished by removing fresh pollen from the pistil with a fine jet of water; also by emasculation. Tools necessary for emasculation are described. Anthesis of the flowers occurs at regular periods of the day. Methods of securing seed from sterile and fertile strains and of protecting plants from parasitic organisms are given.—*J. L. Collins.*

4919. CREW, F. A. E. **A black Leghorn hen which turned white.** *Jour. Heredity* 13: 299-303. 4 fig. 1922 [1923].—A Black Leghorn hen ceased laying and developed head characters like those of the male; the plumage remained hen-like in type but with each successive moult became whiter until the bird was white with black flecks. She died from internal hemorrhage. A large tumor containing abundant luteal cells replaced the ovary. The conclusion is that the formation of large quantities of pigment in the luteal cells is a sign of degeneration, the final stage of which is a structureless mass of pigment lying among the stroma. In this case the cells were almost functionless and had the bird lived she would probably have become cock-feathered. The adrenals could not be found and it is thought they became incorporated in the tumor-growth; this may explain the changes in pigmentation. It must be noted that in the young fowl ovarian and adrenal tissues are histologically continuous.—*F. A. E. Crew.*

4920. CUNNINGHAM, J. T. **Species and adaptation.** *Nature* 109: 775-777. 1922.—The author criticizes Bateson's address at Toronto [see *Bot. Absts.* 11, Entry 3806].—*P. C. Mangelsdorf.*

4921. DANIEL, LUCIEN. **Variations des parfumes sous l'influence du greffage.** [Variations in perfume through the influence of grafting.] *Compt. Rend. Acad. Sci. Paris* 176: 999-1001. 1923.—The author obtained morphological and biochemical variations in grafted plants possessing odoriferous products. A variable type of *Artemis absinthium*, induced by such grafting, produced a seedling which in turn furnished plants which varied morphologically as well as in odor and flavor.—*Richard Wellington.*

4922. DUNN, L. C. **Color inheritance in fowls.** *Jour. Heredity* 14: 23-32. 4 fig. 1923.—Detailed evidence illustrated by photographs is presented on the inheritance of plumage color and pattern in crosses of Columbian pattern (Light Brahma) fowls with black and with buff fowls. The Columbian is found to differ from the buff coloration by a single dominant sex-linked gene which inhibits the development of buff pigment in the feathers and by multiple genes affecting the amount of black pigment in certain parts of the plumage. The Columbian coloration is found to differ from self black by 2 main genes,—the sex-linked gene for inhibition

of buff (present in Columbians, absent in blacks) and a dominant autosomal gene for extension of black to all or nearly all of the plumage (present in blacks, absent in Columbians).—*L. C. Dunn.*

4923. FEDERLEY, HARRY. *Bilden Chromosomenkonjugation, Mendelspaltung und Fertilität bei Speziesbastarden einen Dreibund?* [Does chromosome conjugation, Mendelian segregation and fertility in species hybrids form a triple alliance?] *Hereditas* 4: 161–170. 1 fig. 1923.—“Non-conjugation of the chromosomes in the gametogenesis of species hybrids results in partial or total sterility in F_1 , and non-segregation in F_2 and in back-crosses. In the species hybrid *Chaerocampa porcellus* ♀ × *Ch. elpinor* ♂ [hawk-moths], all the 29 *porcellus*-chromosomes conjugate with the 29 *elpinor*-chromosomes both in the spermatogenesis and in the oogenesis. In this case fertility in F_1 and segregation in F_2 and in back-crosses is consequently to be expected.” The F_1 , for a species-hybrid, is remarkably fertile. Difficulty in making a mating to produce F_2 arose from the fact that the 15 females acquired full development within 2 weeks, while the males matured much more slowly. Two males were carried to maturity in 4 weeks, the 7 others wintered over. Only 1 mating was obtained, and from it only 11 eggs, of which 5 hatched, all dying as caterpillars. The overwintering males eclosed earlier than the parent species, but a mating with a *porcellus* ♀ was brought about. All of the 38 eggs then laid hatched but, though apparently structurally normal, only 7 larvae would eat (*Epilobium angustifolium*), and all except 1 female died before pupation. Hybrid viability depends not only on successful conjugation of chromosomes but also upon other unknown conditions.—The horn of the young larva of *elpinor* is long and dark; that of *porcellus* is a raised wart. The F_1 was like *elpinor*, and the 5 F_2 caterpillars likewise had the horn, but no segregation occurs, for the 38 larvae of the back-cross (*porcellus* ♀ × F_1 ♂) all have the *porcellus*-like small cone.—*J. H. Gerould.*

4924. FEHLINGER, H. *Geschlechtsverhältnis der Geborenen und Alter der Eltern in der Stadt Amsterdam.* [Sex ratio of births and age of parents in Amsterdam.] [German rev. of: *Statistisch Jahrb. d. Stadt Amsterdam*, 1917. (Statistical year book of the city of Amsterdam, 1917.)] *Arch. Rass.- u. Ges. Biol.* 14: 230–231. 1922.

4925. FETSCHER. [German rev. of: WEIL, A. *Die innere Sekretion.* (The internal secretion.) 140 p., 35 fig. Julius Springer: Berlin, 1921.] *Arch. Rass.- u. Ges. Biol.* 14: 186–187. 1922. [See also Bot. Absts. 11, Entry 3892; 12, Entry 4944.]

4926. FICK. *Die Familie Fick.* [The Fick family.] *Arch. Rass.- u. Ges. Biol.* 14: 159–175. 1922.—This paper describes the genealogical tree and special characteristics of the descendants of one Herman Fick, born 1702, in Oberfranken, Germany. In this family are found 6 persons of well-known ability, 7 unusually gifted but less gifted than the 6 first mentioned, 15 gifted more than the average, and 10 others, with more than average ability but who died before reaching full maturity, 4 of these being killed during the World War. The activities of some of those of distinguished ability are noted; also the activities of those of less exceptional ability, among them teachers, governesses, and 1 farmer. The description gives a complete picture of the activities of all the descendants in the 1 line traced through to the present date. The physical traits, such as general build, skin, and hair and eye color, are noted in many individuals. No attempt is made to analyse from any point of view the data presented. The plea is made that more genealogical-biographical studies be made of the aristogenic families of Germany.—*A. H. Estabrook.*

4927. FOLSON, DONALD. *Mutations of the potato. Two somewhat unstable leaf-form sports of the Irish potato.* *Jour. Heredity* 14: 45–48. 3 fig. 1923.—One type of sport was originally observed only once, and the other type 4 times, in over 350,000 plants examined for foliage diseases. The former type, characterized by simple leaves, was followed through a series of 4 vegetative generations and in the 3rd generation reverted partly and temporarily to the compound-leaf norm. The latter type, characterized by thick, distorted, and glabrous leaves, was grown through 1 series of 5 vegetative generations, and frequently reverted in part to the norm.—*Donald Folsom.*

4928. FRANZ, V. [German rev. of: BECHER, SIEGFRIED. *Flügefärbung der Kolibris und geschlechtliche Zuchtwahl*. (Wing color of humming birds and sexual selection.) *Anat. Heft* 57: 447-482. 1919.] *Arch. Rass.- u. Ges. Biol.* 14: 180-181. 1922.

4929. FRANZ, V. [German rev. of: LEHMANN, ERNST. *Variabilität und Blütenmorphologie*. (Variability and flower morphology.) *Biol. Zentralbl.* 38: 1-38. 1918 (see *Bot. Absts.* 7, Entry 1796).] *Arch. Rass.- u. Ges. Biol.* 14: 346-347. 1922.

4930. FRANZ, V. [German rev. of: LUBOSCH, W. *Der Akademiestreit zwischen Geoffroy St.-Hillaire und Cuvier im Jahre 1830 und seine leitenden Gedanken*. (The debate between Geoffroy St.-Hillaire and Cuvier in 1830 and its main issues.) *Biol. Zentralbl.* 38: 357-384, 397-455. 1918.] *Arch. Rass.- u. Ges. Biol.* 14: 345. 1922.

4931. FRETS, G. P. *The index cephalicus*. *Genetica* 4: 481-534. 1922.—Original statistical data are given for the head index of 3,600 persons, gathered from patients and visitors at the Asylum Maasoord of Rotterdam, and also from field trips from the institution. The author's data are compared with these of Galton and others, citing their results. He studied the movement of growth of the head in children, showing that the head index of children changes little during growth.—Summary of findings: (1) variability of head index with men is larger than with women; (2) index of male is lower than that of the female, of brothers lower than sisters; (3) among the low indices there are more males than females, among the high indices there are more females than males; (4) the variability of head-length and head-breadth is larger for the male than for the female; (5) probably the skew curve of frequency of distribution for the index fits better for the author's and the Swedish material of Retzius than the normal curve does.—The author considers that his data show "that the index cephalicus is a characteristic which has a racial and sexual element as a basis and alterations of this take place according to the law of compensational growth, in its effect varying for different capacities of the head." The rule for compensational growth is that alterations of the form of the head take place by an increase or decrease of each of the 3 dimensions of the head in a correlated proportion. Tables giving lengths and breadths with head capacities, taken from Tocher, are shown to demonstrate this compensational growth. Effects of compensational growth are not always the same; in the case of large heads, with an increase of breadth, the height decreases rather than the length shortening, and in the case of small heads, a growing shorter is accompanied by less length rather than by less height.—A. H. Estabrook.

4932. FRUWIRTH, C. *Handbuch der landwirtschaftlichen Pflanzenzüchtung*. 4. neu bearb. Aufl. Bd. 3. *Die Züchtung von Kartoffel, Erdbirne, Lein, Hanf, Tabak, Hopfen, Buchweizen, Hülsenfruchtern und kleeartigen Futterpflanzen*. [Handbook of agricultural plant breeding. 4th rev. ed. Vol. 3. Breeding of potatoes, Jerusalem artichoke, flax, hemp, tobacco, hops, buckwheat, leguminous fodder plants.] xvi + 227 p., 45 fig. Paul Parey: Berlin, 1922.—This edition covers the literature of the subject up to the spring of 1921 [see *Bot. Absts.* 6, Entry 1670]. Extensive changes appear in the chapter on hybridization of peas and beans and some revision in the chapters on potatoes, hemp, flax, and red clover. Recent researches by the author on potatoes, hemp, buckwheat, and leguminous forage plants are included.—L. A. Waitzinger.

4933. GOWEN, MARIE S., and JOHN W. GOWEN. *Studies in milk secretion*. XVII. *Relation between milk yields and butter-fat percentages of the 7 day and 365 day tests, of Holstein-Friesian advanced registry cattle*. *Maine Agric. Exp. Sta. Bull.* 306. 21-60. 1922.—The authors find a correlation of +.660 as the weighted average of correlations between different 365-day milk yields among advanced registry Holstein-Friesian cows. The correlation between a 7-day milk yield and 365-day milk yield of the same lactation is +.598. That between 7-day milk yield and 365-day milk yield of a different lactation is +.462. The corresponding correlations dealing with butter fat percentage were +.715, +.531, and +.423

respectively. All of the regressions were fairly close to linear. Linear prediction formulae are given for various age groups. The analysis indicates no changes in recent years in the correlations which would tend to corroborate the common view that recent discoveries of methods of manipulating feeding and care for the 7-day test have vitiated its value. It is concluded that the 7-day test gives a valuable indication of the potential milk yield and butter-fat percentage of Holstein-Friesian cows although less valuable than a 365-day test.—*Sewall Wright*.

4934. GUILLAUMIN, A. *Les Phalaenopsis cultivés et leurs hybrides*. [The cultivated Phalaenopsids and their hybrids.] *Rev. Hort.* 95: 316-318. 1923.—The cultivated Phalaenopsids and their introduction are noted. Numerous hybrids are mentioned with brief statements as to origin.—*Richard Wellington*.

4935. HARLAN, HARRY V., and MERRIT N. POPE. *Many-noded dwarf barley*. *Jour. Heredity* 12: 269-273. 3 fig. 1922.—A barley plant having a large number of leaves and extremely short internodes was found in an agricultural variety of *Hordeum distichon nudum*. One seed from this plant was germinated in the greenhouse and produced a greatly modified plant somewhat taller than the parent, which was about 50 cm. from crown to tip of awns. Two seeds from this plant produced many-noded dwarf plants about 50 cm. tall. Hybrids of the dwarf strain were made successfully with 4 other varieties of barley. No "dwarf" characteristics were found in the F_1 , but in the F_2 segregation occurred in a ratio of approximately 3 normals to 1 dwarf. The most plausible explanation of the appearance of this dwarf is that it is a mutation.—*R. C. Cook*.

4936. HARLAN, HARRY V., and MERRITT N. POPE. *The use and value of back-crosses in small-grain breeding*. *Jour. Heredity* 13: 319-322. 1922 [1923].—Back-crossing has long been used to fix desired characters in animal breeding, but has not been so widely used in plant breeding, even when the plants used are self-fertilized and therefore immune to the evil effects of the method. An account is given of an experiment to produce smooth-awned barley by back-crossing which has so far given very promising results. In this case all the characters except the smooth awns are desired from 1 parent, and only the smooth awns from the other. Assuming only 20 factors, and no linkage, there would be 1 chance in 1,048,576 that the 20 desired characters would be found in any 1 segregate, and 1 chance in 4 that this segregate would be smooth-awned. It obviously would be impossible to grow such a generation. On the other hand, by back-crossing there would be a rapid elimination of the undesirable characters. The number of plants necessary would be much less, and the chances of finding the desirable one proportionally greater.—*R. C. Cook*.

4937. HERWERDEN, M. A. VAN. [Dutch rev. of: WESZECSKY, O., and F. VERZAR. *Rassenbiologische Untersuchungen mittels Iso-hämagglutininen*. (Racial-biological investigations with iso-haemagglutinins.) *Biochem. Zeitschr.* 26: 33-39. 1921.] *Genetica* 4: 479-480. 1922.

4938. HIRSCH. [German rev. of: WOLTERECK, R. *Variation und Artbildung. Analytische und experimentelle Untersuchungen an pelagischen Daphniden und anderen Cladoceren*. I. Morphologische, entwicklungsgeschichtliche und physiologische Variations-Analyse. (Variation and species formation. Analytical and experimental investigations on pelagic Daphnids and other Cladocerans. I. Morphological, developmental, and physiological analysis of variations.) 145 p., 6 pl., 55 fig. Francke: Bern, 1919.] *Arch. Rass.-u. Ges. Biol.* 14: 179-180. 1922.

4939. HUXLEY, JULIAN. *Glands and development; amphibian metamorphosis considered as consecutive dimorphism controlled by the glands of internal secretion*. *Jour. Heredity* 13: 349-358, 1922; 14: 3-11. 8 fig. 1923.—The essence of metamorphosis is the rapid passage from one form to another during the life history. This morphological change in all cases hitherto

investigated is associated with a physiological change. This in amphibia is concerned with the thyroid, in insects with N-metabolism.—Similar morphological and physiological changes are seen in protandric and protogynous hermaphrodites, and in the type of intersexuality (consecutive) seen in Goldschmidt's moths, produced by crossing geographical races of *Lymantria*. All are cases of consecutive dimorphism.—Why do different *Anuras* require different times to reach metamorphosis? How is it that the limbs react differently to thyroid treatment in *Anura* and *Urodela*? Why do *Necturus* and other perenibrachiates fail to metamorphose even after thyroid treatment? One is driven to believe (1) that the relative rate of thyroid growth varies in different species, metamorphosis occurring only after a certain relative concentration occurs in the blood. (2) That different tissues of the organism are "sensitized" differently to the thyroid hormone, some (e.g., limbs of *Anura*) reacting to it by (a) increased growth, others (e.g., Anuran tail) by (b) breakdown; still others are unaffected (e.g., lung). This probably implies that the different tissues are adapted to different optima of metabolic rate. (3) That the same tissue may be sensitized differently in different species. Attention is drawn to the importance of the study of relative rates of processes for a proper understanding of the physiology of development.—*J. Huxley*.

4940. JENKINS, M. T. A new method of self-pollinating corn. Jour. Heredity 14: 41-44. 2 fig. 1923.—A modified technique for self-pollinating corn is described which is considered more rapid and as safe as older methods. The tassel is pulled and enclosed with the shoot in a 12-pound paper bag. To keep the tassel shedding, its stem is inserted in a small bottle of water attached to the stalk.—*M. T. Jenkins*.

4941. JOHANNSEN, W. Some remarks about units in heredity. Hereditas 4: 133-141. 1923.—Relationships of many terms used in genetics are discussed and the inadequacy of some pointed out; "unit-character," particularly, is one that should be "exterminated." The author suggests that the so-called experimentally demonstrated units are nothing more than expressions for local deviations from the original ("normal") constitutional state in the chromosome; that the whole of Mendelism is "perhaps nothing but an establishment of very many chromosomal irregularities, disturbances or diseases of enormously practical and theoretical importance but without deeper value for an understanding of the 'normal' constitution of natural biotypes."—*Merle C. Coulter*.

4942. KAJANUS, BIRGER. Über Ährchenabstand und Ährchenzahl bei Nachkommen-schaften von Speltoid-Heterozygoten. [Internode length of spikes and number of spikelets in the descendants of speltoid heterozygotes.] Hereditas 4: 10-16. 1923.—In progenies of a cross between 2 common wheats, heterozygous speltoid plants showed almost uniformly greater internode length and fewer spikelets than shown by the *vulgare* plants. Homozygous speltoid plants showed these modifications over both normal and heterozygous plants but in a less pronounced manner. In progenies of a cross between a common wheat and a speltoid type the above facts were established even more clearly. The observed differences are certainly genetical in part but probably due partly to environmental conditions.—*L. R. Waldron*.

4943. KELLY, J. P. *Astylis* Phlox; the relation of this variation in Phlox Drummondii to the large-eyed flower. Jour. Heredity 13: 338-342. 5 fig. 1922 [1923].—In cultures of Drummond's phlox plants with exceptionally small ruffled and styleless flowers occurred; they set no seed although pollen was abundant. This type was named *astylis*; crossed with normals it gave normal progeny. Inbreeding F_1 plants led to a segregation in F_2 of about $\frac{1}{4}$ *astylis*, indicating a unifactorial difference. It was discovered that *astylis* crossed to colored types with small white eyes led to the large-eyed colored types named in commercial circles, *orbicularis*. *Orbicularis* plants always split when inbred into about 25 per cent *astylis*, 50 per cent *orbicularis*, and 25 per cent small-eyed plants.—*J. P. Kelly*.

4944. KOEHLER, O. [German rev. of: WEIL, A. Die innere Sekretion. Eine Einführung für Studierende und Ärzte. (The internal secretion. An introductory text for students and physicians.) 140 p., 35 fig. Julius Springer: Berlin, 1921.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 136-138. 1922. [See also Bot. Absts. 11, Entry 3892; 12, Entry 4925.]

4945. КОЗО-ПОЛЯНСКИЙ, Б. М. [Kozot-Poljanski, B. M.] **Финал Эволюции.** [The finale of evolution.] Буревестник Краснопар [Burevestnik Krasnodar] 24 p. Советской Типографии Куечердоняграотреста [Soviet Printing Presses]: Woronesh, 1922.—A cardinal cause is the interference of man after his emigration from the Pacific continent.—B. M. Kozot-Poljanski.

4946. LÉCAILLON, A. Sur la fécondité des hybrides obtenus par le croisement du Cunard Pilet mâle (*Dafila acuta* L.) et du Cunard sauvage femelle (*Anas boschas* L.). [Fertility of hybrids obtained through crossing a male pintail duck with a female wild duck.] Compt. Rend. Acad. Sci. Paris 174: 1431-1433. 1922.—The hybrids resulting from the crossing of different species of ducks are usually sterile. Those from the mating of a pintail male with a wild female are an exception. In the Toulouse zoological gardens 3 such hybrids have been obtained. A hybrid male mated to a wild female has produced 12 offspring. Young have been obtained when the latter were mated *inter se*.—H. W. Feldman.

4947. LILLIE, F. R., and K. F. BASCOM. An early stage of the free-martin and the parallel history of the interstitial cells. Science 55: 624-625. 1922.—The sex differentiation in the female of cattle before birth is due to genetic factors, while in the male the genetic factors are intensified by the production of a hormone. The interstitial cells appear in the testis of a calf embryo by the time it is 3 cm. long. The interstitial cells secrete the sex hormone, which, circulating in the blood, inhibits the growth of the entire female gonad. The interstitial cells in the gonads of female calves do not appear until about the time of birth; so that the deleterious effect of the male hormone can not be counteracted in the early stages.—W. S. Anderson.

4948. MANGELSDORF, P. C. Heritable characters of maize. XII.—Mealy endosperm. Jour. Heredity 13: 359-365. 4 fig. 1922 [1923].—Mealy endosperm is a type of defective seed in which the corneous endosperm does not develop normally. The character is inherited as a simple recessive. The strain has been crossed with other defectives and found to be distinct. The factor for mealy is linked with a factor for albino seedlings.—P. C. Mangelsdorf.

4949. MELLON, RALPH R. Observations on the origin of biotypes (variants) in pure lines of bacteria. [Abstract.] Absts. Bact. 7: 18. 1923.—Variability in *Bacillus* sp. is identified with the pleomorphic cycle. "Pleomorphism for this form is regarded as a true life cycle and and in reality represents potential variation."—D. Reddick.

4950. MENDIOLA, NEMESIO B., and J. M. CAPINPIN. Breeding ornamental Hibiscus. Philippine Agric. 11: 217-230. 2 pl. 1923.—Species and varieties of *Hibiscus* grown in the Philippines are briefly described and the variability of certain characteristics noted. Methods of improvement by breeding and selection, and propagation methods are discussed. Brief descriptions are given of numerous seedlings produced from parents of unknown purity.—Richard Wellington.

4951. MINER, JOHN RICE. The probable error of the vital index of a population. Proc. Nation. Acad. Sci. [U. S. A.] 8: 106-108. 1922.—The author derives the formula for the probable error of the birth-death ratio or vital index for use in estimating the significance of differences in this index in different communities. Letting B = number of births in a year and D = number of deaths in a year, he obtains the approximate formula $PE \left\{ \frac{100 B}{D} \right\} = 67.449 \frac{B}{D} \sqrt{\frac{1}{B} + \frac{1}{D}}$. A more complex formula, which involves slightly less approximation but requires knowledge of the population of the community, is also given.—Sewall Wright.

4952. MIYAKE, KIICHI, and YOSHITAKA IMAI. Genetic studies in the opium poppy (*Papaver somniferum* L.). I. On the flower color. Bot. Mag. Tokyo 37: (1)-(13). 1 fig. 1923. [In Japanese.]—The chief results obtained are as follows: (1) The allelomorphs investigated

are the following 5: R, r ; in the presence of the subsequent D factor, R is responsible for the red flower, and its recessive mate, r , represents purple flower. The flower color of the hybrid is dark red, being almost intermediate between both zygotes.— D, d ; these allelomorphs are responsible for the eye color of the flower, i.e., either purple or white. The R factor working with double d produces red flower with white center, but the flower remains colorless in its double recessive combination.— I, i ; this dominant factor changes white centered red flower into white, acting as an inhibition to the colored.— S, s ; the former is responsible in producing the "Sakura" flower, and the s s -composition represents a recessive white flower.— H, h , the dominant factor acts as an inhibitor to "Sakura," changing the flower color into white. (2) There are 2 kinds of white flower, i.e., the dominant and the recessive to every white-centered red and "Sakura" flower. (3) A linkage of high intensity was found between the r and i factors."—*Kiichi Miyake and Yoshitaka Imai*.

4953. MOHR, OTTÓ L. A somatic mutation in the singed locus of the X-chromosome in *Drosophila melanogaster*. *Hereditas* 4: 142-160. 3 fig. 1923.—The article describes a striking case of a mosaic male, the left half of which, except head, had singed hairs and bristles; adjoining portion of right dorsal side of thorax and small adjoining portion of right side of head was also singed, the line of demarcation between singed and normal being clear everywhere. The singed had arisen by mutation as the composition of the fly in other respects was tested and found to conform to expectation based on its supposed parents, which were of non-singed stock. The germinal tissue also was mosaic, for about $\frac{1}{2}$ the sperm transmitted singed and $\frac{1}{2}$ transmitted normal hairs. Hence the mutation occurred in a nucleus of an early cleavage (2-cell?) stage, and this nucleus must have been destined to give rise both to part of the germinal and part of the somatic tissue, contrary to the condition found by Morgan and Bridges in their gynandromorphs. Identity of locus of the new singed (s_a3) with the old was proved by crosses with the old and by its linkage with other genes. It is a different allelomorph, however, since the homozygous female lays fertile, normal-appearing eggs, unlike the female homozygous for the original singed gene. "Compound" females, having both an "old" and a "new" singed gene, also lay fertile, normal-appearing eggs.—*H. J. Muller*.

4954. NAGAI, ISABURO. Notes on the species hybrids in the genus *Mosla*. Japanese Jour. Bot. 1: 93-104. 2 pl. 1923.—At least 7 species of the genus *Mosla* are known at present: *M. Orthodon*, *M. Hadai*, and *M. punctata* are closely allied to each other, while *M. punctata* and *M. grosseserrata* are distinct species. The F_1 hybrids between *M. Orthodon* and *M. punctata* and between *M. leucantha* and *M. punctata* are completely sterile; some of the characters resemble one parent, some the other, while the remainder are intermediate. The F_1 hybrid between *M. leucantha* and *M. Orthodon* bore purple flowers like *M. Orthodon* and in F_2 the plants segregated into a ratio of 1 purple:2 tinged:1 white. Population also segregated into a 1:2:1 ratio for branching habit. A natural P_1 hybrid between *M. grosseserrata* and *M. punctata* was sterile and more nearly resembled *M. punctata* although traces of *M. grosseserrata* were present. *M. Orthodon* produces thymol while *M. Hadai* produces the isomer carvacrol but no thymol. In morphological characters the P_1 resembles pure *M. Hadai* except in branching habit in which it resembles *M. Orthodon*. In F_2 segregation takes place in a number of characters giving rise to new forms. A ratio of 15 normal and half-dwarfs to 1 dwarf was obtained and other segregants occurred. Selection was effective in later generations in raising the percentage of oil over that of either parent. To measure the degree of resemblance of hybrids to parental species the author uses the formulae: $Rp = \frac{1}{n} \times p$, $Rm = \frac{1}{n} \times m$, $Rpm = \frac{1}{n} \times pm$, where R = degree of resemblance, n = total number of characters examined, p = number of paternal characters, m = number of maternal characters, pm = number of intermediate characters. He used $Rp + Rm$ as a measure of heterogeneity, and $Rp - Rm$ as a measure of dominancy.—*Walter Scott Malloch*.

4955. NIRODY, B. S. Investigations in avocado breeding. California Avocado Assoc. Ann. Rept. 1921-22: 65-78. 4 fig. 1922.—The author discusses the 3 groups or "races" and

some leading commercial varieties of avocado, especially as to their horticultural merits and demerits, and lists qualities desirable in commercial varieties. Promising combinations of varieties with which crossing was attempted are listed and discussed. A tabular statement gives the time of day at which the flowers of various varieties open, shed their pollen, and close, and another lists pairs of varieties suitable for interplanting, selected on the basis of season of blooming and daily time of shedding pollen. The special technique of avocado cross-pollination is described.—*Howard B. Frost.*

4956. OSBURN, R. C. Some common misconceptions of evolution. *Ohio Jour. Sci.* 22: 173-192. 1922.

4957. POLL, H. [German rev. of: TENDELOO, N. PH. *Konstitutionspathologie und Erbllichkeit.* (Constitutional pathology and heredity.) 32 p. Julius Springer: Berlin, 1921.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 213-214. 1922.

4958. RASMUSON, HANS. Über die Rübenpfropfungen von Edler und einige neue ähnliche Versuche. [On Edler's beet grafts and several new experiments of similar character.] *Hereditas* 4: 1-9. 1923.—Edler found that sugar beet seedlings grafted on red beet and the latter grafted on sugar beet split up into different colors. He concluded that the segregation was due to the influence of the root stock. Rasmuson finds no color segregation and therefore concludes that the results obtained by the former investigator were due either to impure stock or to cross-fertilization.—*Richard Wellington.*

4959. ROSEN, DANIEL. Some remarks about the distance between the genes in *Drosophila melanogaster*. *Hereditas* 4: 231-234. 1923.—The author proposes that all "contiguous," linked genes dealt with may really be the same distance apart, the different per cents of separations observed between them being due not to different chromosome distances, as the chromosome maps seem to indicate, but to different frequencies of crossing over in the chromosome, caused by "different degrees of affinity" between the respective "contiguous" genes.—*H. J. Muller.*

4960. SAUNDERS, C. E., and G. G. MOE. Some observations on the inheritance of awns and hoods in barley. *Proc. and Trans. Roy. Soc. Canada* III, 16: 15-26. 6 pl. 1922.—Arlington barley is 6-rowed and as grown at Ottawa is not entirely awnless, the median floret carrying short awns. In 3 years out of 7 at Ottawa, Arlington developed winter type although spring sown. Time of sowing in the spring was not the determining factor in this respect. Arlington, used as ♀ parent, was crossed with (1) a 6-rowed bearded and hullless variety, (2) a 2-rowed hooded and hullless variety, and (3) a 2-rowed bearded and hulled variety. The ♂ parents were recent extractives but evidently nearly or quite homozygous. The F₁ plant of cross (1) showed intermediacy in regard to awns. In the F₂ generation segregation was of a simple 1: 2: 1 character in regard to beards. The numbers obtained were 44 plants like the ♂ parent, 67 plants like Arlington, and 114 intermediates; classification was difficult.—In cross (2) the F₁ plants were almost perfectly 6-rowed, 2-rowedness being recessive. Four phenotypes resulted in the F₂: I, 2-rowed, awnless, and hooded; II, 6-rowed or nearly so, awnless and hooded; III, 2-rowed, awned; IV, Arlington type, with lateral rows not always completely fertile. Phenotype I contained 2 genotypes: (A) hooded and homozygous, and (B) awnless and heterozygous producing I (A), I (B) and III. Phenotype II contained 4 genotypes: (A) homozygous 6-rowed, hooded; (B) heterozygous 6-rowed, producing II (A), II (B), and IV (A); (C) homozygous hooded but heterozygous 6-rowed, producing I (A), II (A), and II (C); and (D) heterozygous 6-rowed and awnless, producing representatives of the 9 genotypes. Phenotype III was simply genotypic and homozygous. Phenotype IV contained 2 genotypes: (A) Arlington type (homozygous) and (B) a heterozygous Arlington type producing III, IV (A) and IV (B). The F₂ plants rather roughly approximated a 3: 9: 1: 3 ratio.—In cross (3) the F₁ plants were again almost completely 6-rowed. The F₂ showed 2 phenotypes: I, 2-rowed and awned, and II, like the F₁ plant. Two genotypes are found in II: (A) a heterozygous form and (B) a homozygous form apparently identical with Arlington. The F₂ plants only approximated a 1: 3 ratio.—*L. R. Waldron.*

4961. SAX, KARL. **Sterility relationship in Maine apple varieties.** Maine Agric. Exp. Sta. Bull. 307. 61-76. 1 fig. 1922.—This bulletin is mainly a study of the sterility relationship of apple varieties and the part played by insects in fertilization.—George L. Slate.

4962. SCHAFFNER, JOHN H. **Sex reversal in the Japanese hop.** Bull. Torrey Bot. Club 50: 73-79. 2 pl. 1923.—Experiments were made for sex reversal in *Humulus japonicus* Sieb. and Zucc., which is a dioecious plant. The results of these and similar previous experiments lead the writer to conclude that "dioeciousness with its accompanying sexual dimorphism is not due to the absence in either the staminate or carpellate individual of a complete set of hereditary factors for the expression of all the sexual characters, both male and female; nor is the monosporangiateness of the normal individual due to the presence of a homozygous or heterozygous condition of any kind of hereditary sex determination whatsoever."—P. A. Munz.

4963. SCHEERER. [German rev. of: JABLONSKI. **Zur Vererbung der Myopie.** (The inheritance of myopia.) Klin. Monatsbl. Augenheilkunde 68: 110. 1922.] Arch. Rass.-u. Ges. Biol. 14: 447. 1923.

4964. SCHEIDT. [German rev. of: WERTH, E. **Der fossile Mensch.** [Fossil man.] 336 p. Gebrüder Borntraeger: Berlin, 1921.] Arch. Rass.-u. Ges.-Biol. 14: 361-362. 1922.

4965. SCHMIDT, JOHS. **Racial investigations. VII. Annual fluctuations of racial characters in *Zoarces viviparus* L.** Compt. Rend. Trav. Lab. Carlsberg 14¹⁶: 1-24. 1921 [1922].—Individuals of *Zoarces* in a warmer, less saline water produce offspring showing a significant increase in number of vertebrae, and a decrease in number of rays in pectoral fins and pigment spots, when compared with offspring reared in the original environment. The number of hard rays in the dorsal fin was examined in addition to these 3 characters, over a period of 10 years. The averages of various characters show independent fluctuations from year to year, depending upon the conditions at the "sensitive period" in the embryo stage. The population is biotypically stationary, but the phenotype is continually changing.—A comparison of the average number of pectoral rays in populations at Roskilde Fjord and at Ise Fjord, about 50 km. kilometers distant, in years 1915-1921, shows that corresponding annual fluctuations occurred; the same external factor or factors has influenced both, although it was more impressive at Roskilde Fjorde. A study of the number of hard rays in the populations at Roskilde Fjord and at Kjels Nors, Langeland, for 1913-1919, also reveals the similar effect of environment at both places; but the constant wide differences between the races indicates the presence of genetic dissimilarities. Experiments on the common trout show that temperature may be a factor. The lowest number of vertebrae was produced from a quantity of eggs developed at the intermediate of 3 temperatures.—H. W. Feldman.

4966. SCHMIDT, JOHS. **Racial investigations VIII. The numerical significance of fused vertebrae.** Compt. Rend. Trav. Lab. Carlsberg 14¹⁶: 1-5. 1921 [1922].—A type of fused vertebrae occurring in the 5 last vertebrae of trout was observed in which the haemal arch is double in its proximal part, being thus bifurcated; the neural arch is double. In dealing with data on the vertebrae numbers it is satisfactory to count fused vertebrae as 1½. When this is done, the averages of samples of normal individuals are found to coincide with those of individuals with double arches.—H. W. Feldman.

4967. SCHWARZENBACH, FRITZ. **Untersuchungen über die Sterilität von *Cardamine bulbifera* (L.) Crantz unter der Annahme eines hybriden Ursprungs dieser Art.** [The sterility of *Cardamine bulbifera* with reference to the theory of a hybrid origin.] Flora 115: 393-514. 3 pl., 22 fig. 1922.—The peculiarities of *C. bulbifera*—reduced sexual fertility, prolific formation of bulbils, and a chromosome number double that of other species of *Cardamine*—were studied with reference to the possibilities of its origin as a mutant or as a hybrid. The study covered ecology and geographical distribution, the cytology of pollen and ovule, comparisons with other hybrids—especially spontaneous hybrids of *Cardamine* species of the *Dentaria*

group—and experimental attempts to produce *C. bulbifera* anew by crossings. The latter were not successful. The other investigations favor the theory of a hybrid origin.—A. G. Stockey.

4968. SIEMENS. [German rev. of: DAVENPORT, C. B. The feebly inhibited. Carnegie Inst. Washington Publ. 236. 158 p., 89 fig. 1915.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 220. 1922. [See also Bot. Absts. 1, Entry 873.]

4969. SIEMENS. [German rev. of: HEIDE, WILHELM. Über hereditäre Ataxie. (On hereditary ataxia.) 37 p. Diss. Breslau, 1919.] Arch. Rass.- u. Ges.-Biol. 14: 199. 1922.

4970. SIEMENS. [German rev. of: SCHLICHTING, WALTER. Welchen Einfluss hat der Alkohol auf die Nachkommenschaft? (What influence has alcohol on the descendants?) Diss. Berlin, 1919.] Arch. Rass.- u. Ges.-Biol. 14: 197. 1922.

4971. SIEMENS. [German rev. of: STROOP, FRANZ. Über eine neue Chorea-Huntington-Familie. (A new Huntington-chorea family.) Diss. Marburg, 1919.] Arch. Rass.- u. Ges.-Biol. 14: 200. 1922.

4972. SIEMENS. [German rev. of: TOPHOVEN, FRANZ. Statistische Erhebungen über Verhältnisse bei Knaben- und Mädchengeburten. (Statistical investigations on the ratio of male and female births.) Diss. Bonn, 1919.] Arch. Rass.- u. Ges.-Biol. 14: 196. 1922.

4973. SIEMENS, H. W. Über die Grundbegriffe der modernen Vererbungslehre. [On the fundamental concept of modern genetics.] Münchener Mediz. Wochenschr. 65: 1402-1405. 1918.

4974. SIEMENS, H. W. Was ist Rassenhygiene? [What is race hygiene?] Deutschlands Erneuerung 2: 280-282. 1918.

4975. SIEMENS, H. W. Erbliche und nichterbliche Disposition. [Hereditary and non-hereditary disposition.] Berliner Klin. Wochenschr. 56: 313-316. 1919.

4976. SIEMENS, H. W. Über Vorkommen und Bedeutung der gehäuften Blutsverwandtschaft der Eltern bei den Dermatosen. [Occurrence and significance of cumulative sanginity of the parents in the dermatoses.] Arch. Dermatol. u. Syphilis Org. 132: 206-226. 1921.

4977. SIRKS, M. J. [Dutch rev. of: BLÜHM, A. Über einen Fall experimenteller Verschiebung des Geschlechtverhältnisses bei Säugetieren. (A case of experimental shifting of the sex-ratio in mammals.) Sitzungsber. Preuss. Akad. Wiss. 34: 549-556. 1921.] Genetica 4: 536-537. 1922.

4978. SIRKS, M. J. [Dutch rev. of: HAECKER, V. Allgemeine Vererbungslehre. (General text-book of genetics.) 3rd ed., 16 × 24 cm., ix + 444p., 149 fig. Friedr. Vieweg Sohn: Braunschweig, 1921 (see Bot. Absts. 10, Entry 92).] Genetica 4: 465. 1922.

4979. SIRKS, M. J. [Dutch rev. of: SIEMENS, H. W. Einführung in die allgemeine Konstitutions- und Vererbungs-pathologie. (Introduction to general constitutional and hereditary pathology.) 229 p., 80 fig. Julius Springer: Berlin, 1921.] Genetica 4: 479. 1922. [See also Bot. Absts. 11, Entry 3859; 12, Entries 215, 1736.]

4980. STÄHLI, J. Das Krankheitsbild des Keratokonus vom Standpunkte der Variabilitätslehre (mit zwei klinischen Beispielen von Familiarität des Keratokonus und einen Anhang mit Bemerkungen zur Myopiefrage). [The pathological aspect of conical cornea from the

standpoint of the theory of variation (with two clinical cases of familial conical cornea and a supplement with notes on the question of myopia.) *Klin. Monatsbl. Augenh.* 62: 712. 1919. [See also *Bot. Absts.* 11, Entry 355.]

4981. STEHLIK, W. Bekämpfung des Wurzelbrandes bei der Zuckerrübe durch ihre Züchtung. [Control of sugar beet root-rot by breeding.] *Öst-Ung. Zeitschr. Zuckerind. Landw.* 47: 1-10. 1918.

4982. STEHLÍK, V., AND V. TYMICH. Šlechtitelský význam varieta typu skládajících českou červenou přesinku. [The genetical significance of varieties and types in red Bohemian commercial wheat.] *Zemědělský Arch.* 11: 335-365. 1921.

4983. STRAMPELLI, B. Un nuovo caso di disgiunzione pigmentale in una infiorescenza di "Dahlia variabilis." [On a new case of pigmental disjunction in an inflorescence of "Dahlia variabilis."] *Annali Bot.* 15: 276-279. 2 fig. 1922.

4984. SÜFFERT, F. [German rev. of: (1) MEIROWSKY, W. Über die Entstehung der sogenannten kongenitalen Missbildungen der Haut. (On the origin of the so-called congenital defects of the skin.) 192 p., 70 fig. W. Braunmüller: Wien, 1919. (2) MEIROWSKY, W., UND LEVEN. Tierzeichnung, Menschenscheckung und Systematisation der Muttermäler. (Animal color patterns, spotted human beings, and the classification of moles and birth marks.) 79 p., 19 pl., 283 fig. Julius Springer: Berlin, 1921.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 214-219. 1922.

4985. TANAKA, TYÔZABURÔ. Citrus fruits of Japan; with notes on their history and the origin of varieties through bud variation. *Jour. Heredity* 13: 243-253. *Frontispiece*, 2 fig. 1922 [1923].—Nearly $\frac{7}{10}$ of the Japanese "orange" crop consists of *Unshû Mikan* (called "Satsuma" in U. S. A.), belonging to the mandarin species. The Owari variety of Satsuma has produced 2 variant forms known as *Kairyô Unshô* and *Wasé*; it is considered certain, in view of the pollen sterility of Satsumas, that they did not arise from fertilized eggs. The *Wasé*, which differs in many characters from Owari, has been found in several localities; slight differences among these strains indicate an independent origin and several of them are known to have originated by bud variation. The *Wasé* frequently produces branches of Owari, and this ready reversion to the parental type suggests that the *Wasé* may be a chimera. Other cases of genetic bud variation in *Citrus* are mentioned, including a form with corrugated fruit which always has 2 types of leaf and fruit on the same tree. The author discusses the characteristics and Japanese history of other varieties of *Citrus*. The Washington navel orange is made fruitful, in spite of the cool, moist climate, by a dwarfing process.—Howard B. Frost.

4986. TEMPLETON, G. S. Unusual color inheritance. *Jour. Heredity* 14: 39-40. 1 fig. 1923.—One calf of the Angus bull, Quoman of Tierra Alta 248,048, by a Hereford cow is red instead of black, the usual color in this cross. The 38 other calves sired by this bull are all black; nevertheless the only logical way to account for the color of this 1 calf is to assume that the bull is heterozygous for red. As 35 of these calves were out of pure-bred Angus cows, the heterozygous condition of the sire would hardly be expected to show in these crosses.—R. C. Cook.

4987. THAYER, PAUL. Raspberry breeding notes. *Jour. Heredity* 14: 12-13. 1 fig. 1923.—The writer describes a cross between a yellow *Rubus occidentalis* and a yellow *Rubus strigosus* resulting in the production of a yellow *Rubus neglectus*. This suggests the possible production of red- or black-fruited "purple caps" by using a yellow fruited or albino variety as 1 parent.—Crosses of Cuthbert and Ranere showed a surprising number of plants with sterile bloom, especially when the close botanical relationship of the 2 is considered.—Paul Thayer.

4988. TRABUT, LOUIS. *Carpoxénie et mutations gemmaires chez les citrus cultivés.* [*Carpoxenia* and bud mutations in cultivated citrus.] *Compt. Rend. Acad. Sci. Paris* 176: 772-774. 1923.—The author discusses the so-called "bud mutations" of citrus, and suggests that part of these variations may be due to cross-pollination. For several years he has noted variant fruits on citrus trees, especially with navel oranges. Occasional navel oranges have contained seed, which are due to cross-pollination since these varieties have no pollen; variant sectors of rind have been noted on such fruits. One fruit of Golden Buckeye navel orange had a sector of rind resembling the rind of the fruit of a citron tree near by. It is suggested that cross-pollination may modify the fruit ("*carpoxenia*") and even buds near it ("*cladoxenia*").—*Howard B. Frost.*

4989. TURESSON, GÖTE. *The scope and import of genecology.* *Hereditas* 4: 171-176. 1923.—Advance in ecology has been mainly along 2 lines: individual organism as related to environment (autecology) and plant communities, or vegetation, as related to environment (synecology). Autecology has a twofold aspect, viz., the ecology of the individual organism as well as of the species. This paper points out the radically different nature of the problems involved.—Modifications of organisms in response to different environmental factors have already been studied, but the hereditary variation in relation to habitat has been neglected. Hereditary variations within the species are rarely mentioned in autecological works.—The Linnean species is composed of a great number of hereditary forms of different and complex types confined to definite habitats. The species and their hereditary habitat types, as related to environment, constitute a phase of ecology not previously studied. This study necessitates cultivation, under the same conditions, of a great number of individuals of the species collected in different habitats. These plantings must be supplemented by breeding experiments.—Species-ecology is denoted by the term genecology as distinguished from the ecology of the individual organism, or autecology. From the point of view of genecology the Linnean species represent a genetically complex community the distribution and composition of which are determined largely by ecological factors and the genotypical constitution of the individuals composing the species community. The name *ecospecies* has been employed by the author. Hereditary variation within the *ecospecies* and its relation to habitat conditions is one of the most important problems in genecology. The *ecospecies* becomes differentiated into different hereditary types when distributed over an area presenting different habitats. Ecotype is a term used to cover the ecological sub-unit of the *ecospecies* arising as a result of the differentiation of the species-population in response to particular habitat conditions.—The main objects of genecology are to determine the grouping in nature of individuals into *ecospecies* and *ecotypes* which represent various combinations of Mendelian factors and to determine the causes which control this grouping.—Genecological units do not necessarily coincide with the units of the systematists, due to a large extent to different conceptions of the species. From the genecologist's point of view the species represent an intercrossing community, the members of which have secondarily become clustered in groups, namely, *ecotypes* on account of the differentiating effect of environmental factors upon the genotypically heterogeneous population. From the systematist's point of view a species is composed of a "*forma genuina*" and deviations are subordinated under this type as varieties and forms of less systematic value.—Aside from the untenability of this view, the supposed type may include a number of *ecotypes* and several varieties may conversely be found as normal constituents of one and the same *ecotype*. There is a tendency too by systematists to split the species into smaller ones, creating many units, all of which rank as species.—Only as long as these small species (elementary species, vicarial species, *microspecies*, etc.) represent *ecotypes*, a point to be investigated in each case, and only as long as they are present as constituent parts of the community of individuals called *ecospecies* do they tell anything of the morphology of that community from a genecological point of view.—Purely genetical units do not cover the genecological. The genetical analyses of Linnean species proved the constancy of the genotype, which then became the real unit in genetics while the Linnean species, being an aggregate of individuals with different genotypical construction, is still held to be a purely conventional conception.—To transfer the species concept to the pure line

concept on account of the constancy of the genotype is to ignore the ecological side of the species problem. Because of its genetically heterogeneous nature the Linnean species is able to cover a vast region by responding genotypically to a wide range of different habitats within the region. A knowledge of the origin of the genecological units can thus be gained by studying the ecotypes.—The behavior of species hybrids in nature is of particular interest in geneecology. When it has been found by experimentation that individuals belonging to different Linnean species may be crossed and give fertile offspring, the question is raised as to the causes of the rarity of such species hybrids in nature. A closer study of the distributional peculiarities of these hybrids, i.e., their localization at isolated points within the region covered by the 2 species, their sporadic occurrence between the distribution areas of the 2 parent species, and the tendency of certain species hybrids to increase when nature is disturbed by man tend to emphasize the view that the study of the species problem along the lines indicated is urgently needed as a complement to the Mendelian study of the species problem, if a deeper understanding of the questions involved is to be attained.—The importance of geneecology for other branches of natural science in its relation to plant geography both as to questions of species in regard to plant communities, is especially apparent. The analysis of plant communities during the past few years, particularly in Sweden, had disclosed that associations are made up of groups of plants of different associative values. Some of these species are constantly found wherever the particular association occurs and hence are called constants. Because the species belonging to the constant group accompany the association over a wide geographical range it is concluded that these species do not respond to ecological factors prevailing in the different regional points but remain constant, forming the fixed frame-work of the association. This conclusion, however, is not warranted from a geneecological point of view. A geneecological study of the constants of the particular association from different geographical points of its distribution area is needed before such a statement can be made. Many of these constants are notoriously variable, which points rather to the fact that it is the ability of these species to respond genotypically to a wide range of different ecological factors that enables them to establish associations in dissimilar climatic regions.—*H. L. Shantz.*

4990. WEATHERWAX, P. *The story of the maize plant.* (Univ. of Chicago Sci. Ser.) 247 p., 2 col. pl., 174 fig. University of Chicago Press: Chicago; Cambridge University Press: Cambridge, 1923.—This is a general treatise on the history, origin, morphology, culture, and heredity of maize. The several theories of the origin of maize are discussed and the conclusion is reached that maize developed by simple evolution from an ancestral form common to *Zea*, *Tripsacum*, and *Euchlaena*.—Xenia, multiple factors, hybrid vigor, methods of breeding, and the technique of hybridization are discussed in 2 chapters devoted to heredity and breeding, but much material of interest to geneticists is found throughout the book. The flowering habits, the process of fertilization, and the development of the endosperm are discussed in detail as well as the morphology of the vegetative parts of the plant. The chapters devoted to these subjects are compiled largely from the author's previously published papers.—*J. H. Kempton.*

4991. WINGE, Ö. *On a partial sex-linked inheritance of eye color in man.* Compt. Rend. Trav. Lab. Carlsberg 14¹²: 1-23. 1921 [1922].—Statistics from diverse sources for the most part agree in showing a perceptibly greater frequency of brown eyes among women than among men. There would seem to be only 2 possible explanations: either there is a differential death rate with reference to sex and eye-color or there is some form of sex-linked heredity. A critical examination of data based on 1399 Danish children and their parents furnishes the basis for a discussion of this question. No satisfactory evidence is found for a selective death rate, but there seems to be evidence for a sex-linked factor. This evidence is illustrated by families in which one parent has blue eyes, the other brown. In such matings, if the father has brown eyes there is an excess of brown-eyed daughters; if he has blue eyes there is an excess of blue-eyed children of both sexes. Two dominant factors for brown eye pigment are postulated; *B*, the one generally recognized, and *W*, a sex-linked factor. It is further

assumed that *b W* eggs do not survive. When the theoretical relative frequency of different types of matings is computed on this hypothesis the agreement between the observed and expected distribution of eye color in children from matings of all types is remarkably close. The hypothesis would also account for some of the rare but undoubted cases in which blue-eyed parents produce brown-eyed children. Others of these cases are due to a restrictive factor, which results in blue eyes in a genotypically brown-eyed individual. This latter factor also tends to affect the visual acuity.—*C. H. Danforth.*

4992. WRIGHT, SEWALL. **The effects of inbreeding and crossbreeding on guinea-pigs.** U. S. Dept. Agric. Bull. 1090. 63 p., 6 pl., 11 fig. 1923.—Inbreeding of guinea pigs by brother-sister matings has been continued for 13 years, 1906–1919. Each of 23 families, with 2 exceptions, originated from 1 pair of animals. Of these, 18 existed in 1915; in 1917, 5 were selected for perpetuation. As many as 23 generations had been recorded in 1921. In 1911 records were started on a control stock which was maintained by avoiding matings as close as those between second cousins.—I. A slow average decline in vigor in all characteristics has occurred. In fertility (frequency and size of litter) the effect was most marked; it can not be accounted for by environmental conditions. "The decline is greater in the gains after birth than in birth weight, and greater in the percentage raised of the young born alive than in the percentage born alive. The ability to raise large litters has fallen off much more than ability to raise small litters. A comparison of the inbred guinea-pigs with a control stock, raised under identical conditions without inbreeding, and derived in the main from the same line bred stock as the inbred families, indicates that the inbreds have suffered a genetic decline in vigor in all characteristics. The decline in fertility is again shown to be most marked. Experimental inoculation with tuberculosis has shown that the inbreds were inferior on the average to the controls in disease resistance." The sex ratio was unaffected.—II. An obvious differentiation in various characters occurred among the inbred families, which increased as inbreeding progressed. Each family became strikingly uniform in color; members could be readily recognized by their color and pattern. "In a similar way, certain subfamilies became differentiated from other subfamilies and from other families by developing a strong tendency toward reappearance of an ancestral 4th toe on the hind feet." * * The tendency to produce a given type of monstrosity has been characteristic of certain families. Such a tendency has had no connection with the vigor of the family in other respects. * * There was evidence of heredity within the families of the tendency to produce these abnormalities. There was no evidence that inbreeding has any specific causal connection with the origin of the monsters. Inbreeding seems merely to have brought to light genetic traits in the original stock.—Traits of vigor, including size and frequency of litters, percentage born alive, percentage raised of those born alive, birth weight, and gain to 33 days showed greater differences between families than could be due to chance. A positive correlation, in some cases high, existed between averages of these characters in early and late periods of the history of each family. The records of individual families show no correlation in the average of the different groups of characters, with the exception of birth weight or gain and size of litter. Some families showed extreme vigor in some respects and extreme weakness in others; some showed a combination of extreme vigor in all respects; others a combination of weakness. "The conclusion seems warranted that there was heredity of all traits studied. There did not appear to be heredity of general vigor." Hereditary factors which affect each character by itself are easily distinguished from environmental factors which affect alike growth, mortality among the young, and fertility in all their aspects.—*H. W. Feldman.*

4993. ZIEGLER, H. E. [German rev. of: HERTWIG, OSKAR. *Zur Abwehr des ethischen, des sozialen, des politischen Darwinismus.* (A defense of Darwinism, ethically, socially, and politically.) 2nd ed., 121 p. Jena, 1921.] Arch. Rass.- u. Ges.-Biol. 14: 212–218. 1922.

HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issue Entries 4757, 4770, 4858, 4904, 4932, 4934, 4950, 4954, 4955, 4961, 4962, 4985, 4987, 4988, 5126, 5163, 5175, 5240)

FRUITS AND GENERAL HORTICULTURE

4994. ANONYMOUS. *Berichte der Höheren Gärtnerlehnanstalt zu Dahlem, der Höheren Staatlichen Lehranstalt für Wein, Obst, und Gartenbau zu Geisenheim a.Rh. und der Höheren Staatlichen Lehranstalt für Obst- und Gartenbau zu Proskau für die Rechnungsjahre 1920 und 1921.* [Reports of the higher horticultural institute in Dahlem, the higher government institute for wine, fruit, and truck crops in Geisenheim on Rhine, and the higher government institute for fruit and truck crops in Proskau for the period of 1920-1921.] Landw. Jahrb. 57: *Ergänzungsband I*, 1-139, 1-107, 1-117. 1922.—Reports are given of progress of the various experiments carried on in the above named institutions and detailed description of the activities.—*S. A. Waksman.*

4995. ANONYMOUS. [Rev. of: METHUEN, A. *An alpine A B C and list of easy rock plants.* $x + 35$ p. Methuen and Co.: London, 1922.] *Nature* 111: 216. 1923.

4996. ARENS, P. *Zijn aan het tappen met driptins voordeelen verbodden?* [Are drip-tins advantageous in tapping?] *Arch. Rubberecult.* 3: 36-41. 1919.—The notion that tins from which water drips upon the cut surface after tapping are helpful in securing increased yields of rubber is not well founded. The author tapped 3 fields without tins and used tins on 3 adjacent fields. The following month tins were used on the first 3 fields and removed from the others. No differences were observed either in total yield or in percentage of grades of rubber.—*C. D. La Rue.*

4997. BALLOU, F. H., and I. P. LEWIS. *Spraying experiments in southeastern Ohio, 1922.*—*Monthly Bull. Ohio Agric. Exp. Sta.* 8: 42-50. 1923.—A report is given of spraying experiments for the control of apple scab and blotch in southern Ohio on trees over 30 years of age. Fruit was classified as follows: (1) free from scab; (2) only slightly scabbed; (3) blemished but not deformed by scab; and (4) deformed by scab. Varying strengths of lime sulphur and bordeaux mixture were used. A special feature of the plots sprayed with bordeaux was the variation and the quantities of lime and copper sulphate employed.—*R. C. Thomas.*

4998. BEACH, FRANK. *Picking, packing, and loading apples in bushel baskets and barrels.* *Monthly Bull. Ohio Agric. Exp. Sta.* 7: 197-200. 1923.—The author emphasizes that perfectly grown apples should be so picked and packed as to retain their original value. Methods for packing in bushel baskets and barrels are covered; 19-inch basket pads and star covers are preferred for covering bushel baskets. Proper loading of bushels into cars is discussed.—*R. C. Thomas.*

4999. BRISON, F. R. *Variations in pecans.* *Jour. Heredity* 13: 366-368. 1 fig. 1923.—The pecan is monoecious and wind-pollinated. A high percentage of cross-pollination takes place. Each pecan is apt to vary in genetic constitution from all other pecans on the tree owing partially to the difference in paternal influence as well as to the heterozygous character of the pecan. Seed from the Mother San Saba pecan tree was planted. Pecans produced by the resulting seedlings varied in size from those as large as beans to those over 2 inches in length, indicating that the pecan will not reproduce true from seed. Variations in shape, thickness of shell, and cracking quality were also marked. The development of the pecan is so recent that there remains great opportunity for finding seedlings good enough to introduce as named varieties.—*F. R. Brison.*

5000. BURKETT, J. H. **The pecan in Texas.** Texas Dept. Agric. Bull. 73. 146 p., 9 pl., 25 fig. 1922.—Pecan growing is becoming an important industry in Texas.—The author discusses varieties, methods of grafting, planting, soils, diseases, and insect pests.—*L. Pace.*

5001. DE CASTELLA, F. **Home wine-making.** Jour. Dept. Agric. Victoria 19: 89-102, 176-180. 1 fig. 1921.

5002. DETLEFSEN, J. A., and W. A. RUTH. **An orchard of chestnut hybrids.** Jour. Heredity 13: 305-314. 7 fig. 1923.—A brief résumé of the introduction of the European and Japanese chestnuts is followed by the description of a cross between the American Sweet and the Japanese. Observations on 175 F_2 segregating trees showed loss of remarkable vigor of F_1 and greatly increased variability in many characters, such as size of nut, amount of tomentum, number of nuts to a burr, character of the burr, time of ripening, size of trees, resistance to weevils, etc.—*J. A. Detlefsen.*

5003. GOURLEY, J. H. **Peach growing in Ohio.** Monthly Bull. Ohio Agric. Exp. Sta. 8: 35-42. 1923.—This is a general summary of best practices. The management of young and old orchards is reviewed, including necessary spray programs. Mention is made of the distribution of the peach industry in the state, the soils best adapted to growing, and the varieties best suited to Ohio conditions.—*R. C. Thomas.*

5004. KEIL, J. B. **Apple pollination.** Monthly Bull. Ohio Agric. Exp. Sta. 8: 51-58. 1923.—A report is given of pollination experiments between 1914 and 1917 with the more common commercial varieties of apples; 2479 pollinations were made, which gave a 25 per cent setting. The investigations offer some explanation for the behavior of orchards when planted with large blocks of a similar variety and bring out the desirability of mixed plantings.—*R. C. Thomas.*

5005. RIJKS, A. B. **Bastonderzoek en uitdunning.** [Bark examination and thinning.] Arch. Rubbercult. 4: 345-360. 1920.—Results obtained on the Djasinga Estate in Java are discussed. The author considers bark examination a better criterion for thinning than measurement of the latex yield.—*C. D. La Rue.*

5006. SCHOLL, ERNEST E. **Orcharding in Texas, and nursery inspection.** Texas Dept. Agric. Bull. 72. 247 p., 108 fig. 1922.—Texas nuts and fruits for 1919 were valued at \$14,952,135.—The discussion includes: hazards, preparation of soil, selection and planting, tillage and cover crops, pruning, spraying, grafting, kinds of fruit, orchard pests.—*L. Pace.*

5007. SWINGLE, WALTER T., and T. RALPH ROBINSON. **Two important new types of citrus hybrids for the home garden.**—Citrangequats and limequats. Jour. Agric. Res. 23: 229-238. Pl. 1-5. 1923.—Thomasville citrangequat is a trigeneric hybrid produced by using pollen of Willits citrange (*Citrus sinensis* \times *Poncirus trifoliata*) to fertilize flowers of the oval kumquat, *Fortunella margarita*. The trees are large and vigorous, endure winter temperatures as low as 12°F., are not readily forced by warm weather in late winter, and possess the resistance to citrus canker [caused by *Pseudomonas Citri*] of the female parent. The fruit resembles that of the lime. The oil of the peel is not bitter and the pleasantly acid juice can be used for ade from July to October, after which the fruits are sweet enough to eat out of hand.—Other citrangequats are mentioned and technical descriptions are presented of the following new varieties: Thomasville, Telfair, Sinton.—Eustis limequat is a hybrid resulting from fertilizing the flowers of common or West Indian lime with pollen from the round kumquat. The tree is much harder than the lime and probably can be grown in the warmer parts of the U. S. A. Gulf Coast. It is more or less everbearing. The fruits resemble closely the lime in color, flavor, size, and texture, and the rind is edible. Technical descriptions are presented of the following varieties: Eustace, Lakeland, and Tavares.—*D. Reddick.*

5008. VISCHER, W. *De anatomische bouw van het latexvaten-stelsel bij Hevea in verband met de latex-productie.* [The anatomical structure of the latex-vessel system of Hevea in relation to the latex yield.] Arch. Rubbercult. 4: 473-492. 1920.—The latex capacity of the roots is found to be far less than that of the trunk; the roots cannot, therefore, be considered a latex reservoir. Two types of distribution of latex vessels are found. In 1, the number of vessels is approximately the same for a considerable distance from the base of the tree; in the other the number decreases rapidly from the base upwards. Trees of the latter type are less valuable. Most of the vessels of the roots and the trunk are in direct connection and latex-movements of considerable extent may take place. Radial connections between different rings of vessels are uncommon. Tapping a cut has a direct influence on the pressure in the vessels 1 m. from the cut. Tapping a tree affected with brown bast disease is injurious even though the tapping cut is on a surface which is still healthy. Tapping with 2 cuts, 1 above the other, is condemned because the yield from the upper cut is low in proportion to the bark used and the exhaustion of the vessels in the bark between the cuts may increase susceptibility to brown bast disease.—C. D. La Rue.

5009. VRIES, O. DE. *Verdere gegevens over den invloed van het tappen op latex en rubber.* [Further data on the influence of tapping on latex and rubber.] Arch. Rubbercult. 4: 314-330. 1920.—Prolonging the tapping cut has the same effect as heavier tapping in general: the rubber-content of the latex decreases; the specific gravity increases; and the rubber vulcanizes more rapidly. Increasing the number of tapping cuts has the same effect as lengthening the cut. Two cuts, 1 low and 1 high but on a different surface, gave rubber that was practically identical for both cuts. Two tapings on the same cut in 1 day were tried, but no difference was found in the rubber. Tapping to the wood gave the same results as lengthening the tapping cut but to a more marked degree. Tapping a piece of bark isolated by a cut to the wood all round it did not give a latex with low rubber content and high specific gravity, as was expected. Tapping at different hours of the day gave no differences in the properties of the rubber. The use of drip tins does not affect the properties of the rubber.—C. D. La Rue.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

5010. ANONYMOUS. *Note.* Nature 111: 267. 1923.—It is announced that bulbs of *Chionodoxa*, *Galanthus*, *Scilla*, *Fritillaria imperialis*, *F. Meleagris*, *Muscari*, *Ixia*, and *Eranthis* have been added to the list of bulbs permitted unlimited entry into the U. S. A. for 3 years beginning January 1, 1923.—O. A. Stevens.

5011. BALLOU, F. H. *Ornamental planting in development of the small homestead.* Monthly Bull. Ohio Agric. Exp. Sta. 8: 8-13. Fig. 3-6. 1923.—The development of a ramshackle barn lot into an attractive landscape is illustrated and discussed. Emphasis is placed on the plant materials used, and the short time required to reach an effective landscape scene.—R. C. Thomas.

5012. BARRON, LEONARD. *Lawn-making. Together with proper keeping of putting greens.* vi + 176 p., 31 pl. Doubleday, Page & Co.: New York, 1923.—The 14 chapters treat of renovating the old lawn; how to make a lawn once for all; economical grading; which is better, turf or seed; the fine art of mowing, rolling, and watering; how to feed a lawn; solving the seed problem, insects, etc; the truth about "lawn mixtures," seed mixture for special purposes; lawns for subtropical regions; the best lawn tools and their use; how to make lawn pictures; the peculiar requirements of putting greens; guide to the best lawn grass. This is a practical treatise on the making and maintenance of a lawn.—J. H. Gourley.

5013. BENEDICT, R. C. *Which Boston fern is best?* Jour. Heredity 13: 254-263. 7 fig. 1922.—An experiment is outlined to determine which of the numerous varieties of the Boston fern are most desirable for florists and for the home. Only the once-pinnate varieties are included in this test of 6 months duration. Sets of these varieties are available for distribution to growers who wish to cooperate.—R. C. Cook.

5014. HOTTES, ALFRED C. **A little book of annuals.** 116 p., 51 fig. A. T. De La Mare Co.: New York, 1922.—“This little book of annuals has been written for the increasing throng of amateurs who grow flowers for the love of them. It is meant to be a guide through the season of annual bloom.” The chapters (unnumbered) treat of the use and culture of annuals grown for their flowers; of ornamental grasses; everlastings; decorative seed pods; and annual vines.—*J. H. Gourley.*

5015. HOTTES, ALFRED C. **A little book of perennials.** 170 p., illus. A. T. De La Mare Co.: New York, 1923.—This work treats of the commonly grown perennials, flowers and ornamental plants. The propagation, culture, uses, and treatment for disease and insect pests of perennials are treated.—*J. H. Gourley.*

5016. HOTTES, ALFRED C. **Practical plant propagation.** 224 p., 108 fig. A. T. De La Mare Co.: New York, 1922.—“This book attempts to explain briefly the art and science of increasing plants so that the florist, orchardist, nurseryman, and amateur plant lover may have a guide in the work of properly increasing his stock.” The chapters treat of seeds; cuttings, bulbs, layers and divisions; graftage and stocks; important florists' plants; herbaceous perennials, annuals, bulbous plants; and tree and shrub list.—*J. H. Gourley.*

5017. MAKINS, F. K. **Olive cultivation in the Ionian Islands.** *Indian Forest.* 48: 521-530. 1922.

5018. PALMER, F. E. **Milady's house plants.** 176 p., illus. A. T. De La Mare Co.: New York, 1922.—The author indicates the purpose of the volume as being “to set down briefly and clearly all the more important facts for the benefit of those who are seeking knowledge on this particular subject.” The following subject heads indicate the character of material treated: companionship of flowers; fundamental requirements of all plants; foliage plants for house decorations; flowering plants for house decoration; bulbous plants; house plants out-of-doors in summer; sowing of seeds and rooting of cuttings; outside window boxes in winter; insect pests and remedies; how to treat cut flowers; and sun parlors as plant rooms.—*J. H. Gourley.*

5019. ROGERS, W. S. **Planning your garden.** x+301 p., 105 fig. Doubleday, Page & Co.: Garden City, New York, 1923.—“This volume is designed for those who are not inclined to make use of the service of a professional garden designer. Either excessive cost or intense personal interest in the development of the home grounds may effect this result.” It is a practical treatment of the subject of garden making and the art of landscaping home grounds or estates. The 21 chapters give a comprehensive treatment of the various phases of such a problem including the planting and working out of the grounds, the details of making flower borders and beds, lawns, rock garden, rose garden, vegetable garden, use of water in the landscape, fences and hedges, and other details.—*J. H. Gourley.*

5020. SAFFORD, W. E. **Discovery of the ancestral form of *Dahlia Juarezii*.** *Jour. Heredity* 13: 377-381. 3 fig. 1923.—All cactus Dahlias come from a single plant sent to Europe from Mexico about 1863. This was a “double flowered” form quite similar to the modern variety “Khalif,” and was taken as the type-specimen of a new species, *D. Juarezii*. In 1916 the simple, 8-rayed progenitor of this species was found in Guatemala by Wilson Popenoe.—It is not generally known, but to the Aztecs belongs credit for originating the double-flowered Dahlias, by crossing the wild forms native to the mountains of Mexico.—*R. C. Cook.*

5021. STOUT, A. B. **Sterility in lilies.** *Jour. Heredity* 13: 369-373. 3 fig. 1923.—It is pointed out that in lilies at least Darwin's “Law of Compensation” does not apply, the failure to set seed so often noted being due to incompatibility of the pollen used. In some varieties, chiefly hybrids between different species, complete impotence of pollen is found, but this is unusual. It has been found possible to produce seed of almost all species of lilies studied, by proper selection of pollen, although this has been difficult in some cases.—*R. C. Cook.*

5022. THOMAS, CHARLOTTE RIDER. *Garden whimseys*. vii + 171 p. Macmillan Co.: New York, 1923.—This is a little volume for the amateur flower lover, unpretentious but full of enthusiasm throughout. No attempt is made to give cultural directions and yet, almost parenthetically, many good suggestions are made. The book is well written, evidently designed to win converts to the small yard garden, and deserves a place in the library of every gardener. The 12 chapters deal with bulbs, irises, peonies, roses, perennials, annuals, shrubs, and garden pets.—*J. H. Gourley*.

VEGETABLE CULTURE

5023. FREEMAN, ELLA M. *The home vegetable garden*. vi + 214 p., 8 pl. Macmillan Co.: New York, 1922.—This is the 2nd in a series of books known as the Open Country Books, edited by L. H. Bailey. The purpose of this volume is to interest amateurs in the vegetable garden in part from the nature-study standpoint as well as for the large returns obtainable from a small acreage. The cultural directions are brief and the lists of varieties seem scarcely adequate even for a work of this character. The 30 chapters deal with the pleasure of gardening; laying out, planting, and care of the garden; insect and disease pests; and the culture of the various crops.—*J. H. Gourley*.

5024. KAKAZAKI, Y. *Self-sterility in Chinese cabbage*. Jour. Heredity 13: 374-376. 1 fig. 1923.—Chinese pe-tsai cabbage is ordinarily almost entirely self-sterile. The author desired a quantity of self-fertilized seed, and it was thought possible that there might be greater compatibility between flowers of the different branches of the same plant. The following experiments were tried: (1) flowers were bagged without pollinating artificially; (2) flowers were pollinated artificially with pollen from (a) the same flowers, (b) different flowers in the same inflorescence, (c) different inflorescences on the same plant, (d) different plants. The degree of self-sterility was the same from whatever part of the plant the pollen came, but considerable variation was found in the degree of self-sterility in different plants. It is suggested that a self-fertile strain might be secured by selection.—*R. C. Cook*.

5025. KEIL, J. B. *Dependable varieties of vegetables*. Monthly Bull. Ohio Agric. Exp. Sta. 8: 23-25. 1923.—The article offers a list of vegetables which may serve as a guide to beginners and gardeners of more experience. This list does not include all of the good varieties but aims to call attention to really meritorious ones.—*R. C. Thomas*.

5026. PEMBER, F. R. *A study of the influence of physical soil factors and of various fertilizer chemicals on the growth of the carnation plant*. Rhode Island Agric. Exp. Sta. Bull. 187. 94 p. 1921.—As a 6-year average 40 per cent of the number of flowers produced in 9 months, October-June, were gathered during the first 6 months.—The keeping quality of the flowers was not materially affected by the soil treatment.—Retaining the same soil, plus manure, for 5 years reduced the yield of the best grade of flowers by an average of about 5 per cent below that from fresh soil and manure.—Splitting of the calyces was not affected by sodium silicate nor by extreme progressive increase or decrease in the application of the fertilizer; but where nitrogen was added in large amounts to either soil and manure, or to sand, the percentage of split calyces was reduced.—Chlorosis was unaffected by limestone and by ferrous sulphate.—When the dry material contains about 2 per cent of nitrogen, 0.5 per cent phosphoric oxide, and 1.5-2 per cent potassium oxide the nutritional needs for these ingredients probably have been supplied.—*B. L. Hartwell*.

5027. ROCKWELL, F. F. *Gardening under glass*. x + 297 p., illus. Doubleday, Page & Co.: Garden City, New York, 1923.—The volume is divided into 2 parts, the 1st dealing with gardening under glass, and the 2nd with cultivation of special crops.—This is a well prepared book of a distinctly popular nature. The 1st part treats of cultural matters and the 2nd of growing violets, pineapples, palms, grapes, fruit trees in pots, vegetables in frames, greenhouse and bedding plants, vegetables under glass, and roses.—*J. H. Gourley*.

5028. WOOLEY, R. V. GIFFORD. *Tomato cultivation under glass and outdoors.* 32 p., 2 fig. Country Life: London; Charles Scribner's Sons: New York, 1922.—Chapters on winter cropping, seed sowing, and pests and diseases are included.—C. S. Gager.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 4806, 4829, 4832, 4837, 4841, 4843, 4963, 4967, 4990, 5008, 5134, 5144, 5278, 5283)

5029. BEAUVERD, G. *Tératologie du Primula vulgaris* Huds. [Teratology of *Primula vulgaris*.] Bull. Soc. Bot. Genève 13: 8. 1921.—Two specimens were found with abnormal calyx and green corolla.—W. H. Emig.

5030. BOBILIOFF, W. *Onderzoekingen over het ontstaan van latexvaten en latex bij Hevea brasiliensis.* [The origin of latex vessels and latex in *Hevea brasiliensis*.] Arch. Rubbercult. 3: 43-65. 1919.—Latex formation was studied in plants of all ages from the young seedling to the mature tree. In young cotyledons the latex vessels were observed to develop by the absorption of the cross walls of a row of cells, and also by the growth and branching of some of the cells. Latex formation takes place as soon as the vessels develop. The latex-vessels can be traced directly back to the meristematic tissue. Latex may form in one part of a plant independently of the remainder of the plant. Caoutchouc formation takes place within the latex vessel itself.—C. D. La Rue.

5031. BOWMAN, H. H. M. *Histological variations in Rhizophora mangle.* Rept. Michigan Acad. Sci. 22: 129-134. Pl. 9-12. 1920 [1921].—Tannin is very abundant in all parts of the mangrove plant, especially in the hypodermal leaf cells. These leaf tannin cells are larger in plants growing in more concentrated salt water and there is often an extra layer of hypodermal water-storage cells. The cells of the "transfusion tissue" (so-called by Warming) are thin walled, turgid, and filled with mucilage and are without the thickenings on the walls reported by Warming. In nearly all parts of the plant are stone cells or idioblasts. These are mostly H-shaped or even stellate, with the lumen nearly filled by the thickened, lignified wall. The anthers are of the plurilocular type. The pericycle is a dense ring of sclerenchymatic tissue, making the wood exceedingly tough.—Ernst A. Bessey.

5032. BOWMAN, H. H. M. *The development and activation of hibernacula.* Papers Michigan Acad. Sci. 1: 61-73. Pl. 26-29. 1923.—A study of the factors governing the production of hibernacula in *Spirodela polyrrhiza* (L.) Schleid., *Lemna trisulca* L., *Ceratophyllum demersum* L., *Cabomba caroliniana* A. Gray, and *Myriophyllum spicatum* L. At different times various species of *Utricularia* were also used. The hibernacula of *Lemna* and *Spirodela* are small fronds, heavily charged with starch, which sink to the bottom. Those of the other species are short shoots with smaller crowded leaves, and short internodes, the tissues also being filled with starch. These hibernacula developed in November in aquaria where the temperature remained constant, apparently as a response to the reduced illumination. The activation of the hibernacula is also described.—Ernest A. Bessey.

5033. BROWN, ELIZABETH DOROTHY WUIST. *Apogamy in Phegopteris polypodioides.* Bull. Torrey Bot. Club 50: 17-34. Fig. 1-20. 1923.—Cultures of spores from 2 sources were grown from unmodified and modified Prantl's and Knop's solutions. The filamentous stage was variable in length and could be induced by reversion by unfavorable cultural conditions. Male prothallia were most numerous in modified solutions, female in the unmodified. Both monoecious and dioecious prothallia occurred in all cultures. A large number of apogamous growths are described and the conditions under which such occurred are discussed. It is pointed out that physiological study of fern gametophytes is of importance in shedding light on the expression of various sexual phenomena.—P. A. Munz.

5034. COOK, O. F. **Diversity of internode individuals.** Jour. Heredity 13: 323-328. 4 fig. 1923.—The successive internodes of the same vegetative shoot represent biological equivalents. Therefore, by a comparison of such internodes or even by comparing the halves of the same leaf or other symmetrical organ the problem can be studied of whether biological processes are carried on with mechanical exactness, or whether normal diversity is to be expected. The fact that homologous parts of the same plant are often as different as species, genera, or families does not support the theory that paths of development are followed exactly. In spite of cytological studies very little is known of the nature of the inherited characters, the results that are produced being the only basis of judgment of the nature of the reproductive processes.—R. C. Cook.

5035. ETTER, AUSTIN. **Polyembryony developed under experimental conditions in certain polypodiaceous ferns.** Bull. Torrey Bot. Club 50: 95-107. Pl. 4, fig. 1-6. 1923.—Polyembryony in *Matteuccia Struthiopteris*, *Onoclea sensibilis*, *Dryopteris mollis*, and *Pteris longifolia* was shown to occur occasionally in ordinary cultures and under experimental conditions. Division of prothallia often resulted in regeneration by each part and in subsequent sporophyte formation. The conclusion is made that, when the gametophyte is of sufficient vigor, 1 to several sporophytes may be nourished and brought to independent existence.—P. A. Munz.

5036. LEPESCHKIN, W. **Recherches sur les organes du bord des jeunes feuilles. (Contribution au problème des organes inutiles des plantes.)** [Researches on the marginal organs of young leaves; a contribution to the problem of useless organs of plants.] Bull. Soc. Bot. Genève 13: 226-235. 1921.—It is not possible to state the causes for the change of form in marginal organs of leaves. The cause for the changes is supposed to lie in the residue of a mass of hereditary units.—W. H. Emig.

5037. PILGER, R. **Ueber Verzweigung und Blütenstandbildung bei den Holzgewächsen.** [On branching and the formation of the inflorescence in woody plants.] Bibliotheca Bot. 90. 1-37. 36 fig. 1922.—The growth of woody plants, even in the tropics, is periodic. The portion of the twig which grows between one rest period and another the author (following Volkens) terms a "schub." In the north, or in dry regions, the schub extends from winter bud to winter bud. In the tropics, it is often difficult to determine the limits of the schub, as it is marked only by rest periods. The schub is more commonly unbranched at the north, more commonly branched in the tropics. The branching is termed 'prolepsis.' The branches of the schub may behave differently, some maturing at once, others developing later. The branched tropical schub is primitive. The panicle is the primitive type of inflorescence and represents a portion of a branched schub in which the leaves have been reduced. Its origin is seen in *Chamaecyparis*. The single flowered inflorescence is reduced from the primitive paniculate type. The Ranales do not usually show a primitive type of inflorescence. Inflorescences borne on old and on new shoots represent a specialization of schubs. Those on new shoots are terminal on the vegetative schub. Those on old wood are entirely separate naked schubs. The separation of flower shoots and vegetative shoots is discussed at length. The following special plants are described fully to illustrate the points made: *Corylus*, *Alnus*, *Betula*, *Acer*, *Cornus*, *Forsythia*, and *Nerium*.—K. M. Wiegand.

5038. SAHNI, B. **Modern Psilotaceae and archaic terrestrial plants.** Nature 111: 84. 1923.—One or more cauline xylem strands devoid of protoxylem are normally present in the pith of *Tmesipteris Vieillardii* Dang., an erect terrestrial form said to be endemic in New Caledonia. This may be regarded as a stage in the disintegration of a once continuous and solid cylinder of cauline xylem. Medullary xylem was recorded in *Tmesipteris* by Bertrand in 1885 and by Dangeard in 1890-91.—O. A. Stevens.

5039. WOODCOCK, E. F., and R. DEZEEUW. **The anatomy of the haustorial roots of Comandra.** Rept. Michigan Acad. Sci. 22: 189-192. Pl. 15. 1920 [1921].—A brief description, with

drawing, depicts the anatomy of the haustorial roots of *Comandra pallida* attacking the roots of apple. Material was collected in the state of Washington. The penetration of the haustorium is effected by pressure and the solvent action of a secreted enzyme. A clasping portion of the haustorial root can be distinguished from the absorbing part.—*Ernst A. Bessey.*

5040. DEZEEUW, RICHARD. The value of double infiltration in botanical microtechnique. *Papers Mich. Acad. Sci.* 1: 83-84. 1923.—A method is described for infiltrating material with celloidin and subsequently with paraffin, which makes possible the cutting of thinner sections than by the use of celloidin alone, while retaining the advantages of the celloidin method.—*Ernst A. Bessey.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See in this issue Entries 4774, 4865, 4989, 5050)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 4774, 4849, 4989)

5041. ANDREWS, F. M. Abnormal elaters of *Porella platyphylla*. *Bull. Torrey Bot. Club* 50: 85-87. *Pl. 3.* 1923.—Elaters of variously branched and other abnormal types are described and figured from material collected in Indiana.—*P. A. Munz.*

5042. CAMPBELL, DOUGLAS HOUGHTON. An interesting liverwort. *Science* 57: 384-385. 1923.—Specimens of the Asiatic *Monoselenium tenerum* Griffith have recently been found in a nursery at Oakland, California. This species, based on Indian specimens in 1849, was not again reported until 1910, when Goebel published a new account of it, his material having appeared on earth brought from Canton. The Californian plants were undoubtedly introduced with nursery stock from China or Japan, where the species may not be rare. *Monoselenium* is related to *Dumortiera*.—*C. J. Lyon.*

5043. DISMIER, G. Trois muscinées nouvelles pour la région parisienne: *Platygyrium repens* Br. eur., *Liochlaena lanceolata* Nees et *Jamesoniella autumnalis* (De Cand.) Steph. [Three bryophytes new to the Parisian region: *Platygyrium repens*, *Liochlaena lanceolata* and *Jamesoniella autumnalis*.] *Bull. Soc. Bot. France* 66: 313-316. 1919.—The author, on the basis of his own collections, reports *Platygyrium repens* from near Ferté-Milon (Aisne), *Liochlaena lanceolata* from near Boissy-Saint-Léger (Seine-et-Oise), and *Jamesoniella autumnalis* from the same locality. The 1st and 3rd represent additions to the flora of the district around Paris, while the 2nd is a great rarity. Under each species the distribution in France is discussed, and the *Platygyrium* is accompanied by descriptive notes.—*A. W. Evans.*

5044. DOUIN, CH. Les erreurs en hépaticologie. [Mistakes in hepaticology.] *Compt. Rend. Assoc. Franç. Avanc. Sci.* 43 [Rouen]: 610-613. 1922.—Three common mistakes made by students of the Marchantiales are discussed. The 1st is the assumption of a group of apical cells in the thalli of certain genera; in the author's opinion there is never more than 1 apical cell. The 2nd is the supposed distinction between a "true" dichotomy of the thallus, derived from a group of apical cells, and a "false" dichotomy, derived from a single apical cell. The 3rd is the supposed distinction between "composite" and "simple" sexual receptacles.—*A. W. Evans.*

5045. LEE, WILLIAM A. Irish *Sphagna*. *Irish Nat.* 31: 18-23. 1922.—The author reviews the work done on the peat mosses of Ireland and catalogues the species according to the Warnstorffian system, the distribution being indicated by "vice counties." The list includes 31 species, 62 varieties, and 56 forms and subforms.—*A. W. Evans.*

5046. LEE, WILLIAM A. *Irish Sphagna*. *Irish Nat.* 33 [i.e., 32]: 28-29. 1923.—This is a supplement to an earlier list bearing the same title (see preceding entry). The author lists 10 species, 21 varieties, and 21 forms and subforms of *Sphagnum*, mostly from the counties of Dublin and Wicklow. The records represent "vice-comital" additions and include 3 varieties and 11 forms and subforms not found in the earlier list.—A. W. Evans.

5047. ZODDA, G. *Brevi notizie sulle briofite dell' isola di Rodi*. [Notes on the bryophytes of the island of Rhodes.] *Bull. Soc. Bot. Ital.* 1921: 38, 39. 1921.—A collection of bryophytes made by the author in 1919 in the vicinity of the city of Rhodes and on Mt. Smith yielded 18 species, 13 of which were new to the island. The known bryophytic flora of Rhodes now includes 49 mosses and 7 hepatics.—A. W. Evans.

5048. ZODDA, G. *Cenni sulle briofite forlivese*. [Notes on the bryophytes of Forlì and vicinity.] *Bull. Soc. Bot. Ital.* 1921: 49-52. 1921.—A report is given on a collection of bryophytes made by P. Zangheri in the vicinity of Forlì, Italy. The list of species includes 55 mosses and 11 hepatics and of these, 16 mosses and all the hepatics are new to the district.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

DONALD S. WELCH, *Assistant Editor*

(See also in this issue Entries 4774, 4794, 4816, 4847, 5116, 5117, 5119, 5123, 5124, 5125, 5127, 5128, 5218, 5229, 5231, 5233, 5234, 5235, 5239, 5243, 5253, 5254)

FUNGI

5049. BULLER, A. H. REGINALD. *Rea's British Basidiomyceteae*. [Rev. of: REA, CARLETON. *British Basidiomycetae: A handbook to the larger British Fungi*. xii + 799 p. (Published under the auspices of the British Mycological Society.) Cambridge University Press: London, 1922 (see Bot. Absts. 12, Entry 1978).] *Nature* 111: 213-214. 1923.—"The volume is indispensable to all students of fungi on both sides of the Atlantic. In accuracy of description the book is an immense advance on anything previously produced in Britain." The dropping of main divisions based upon spore characters has its advantages, but in some groups spore color seems to be of more importance than the other characters, e.g., in *Coprinus*.—O. A. Stevens.

5050. BUSTOS, M. R. ESPINOSA. *Informe del Jefe de la seccion Plantas Cryptogames*. [Report of the section of cryptogamic plants.] *Bol. Mus. Nacion. Santiago* 11: 269-270. 1918/19 [1920].—The author reports collections of *Marasmius*, *Lepiota*, *Psilocybe*, *Peziza*, *Fomes*, *Heterosporium*, *Ustilago*, *Gyromitra*, *Clavaria*, and *Sclerotinia*.—*Heterosporium gracile* was found parasitic on the leaves of *Iris florentina*, *Sclerotium Trifoliorum* parasitic on *Trifolium repens*, and *Ustilago Tritici* (Pers.) Jens. causing the loose smut of wheat.—The algae *Nitella clavata* (Berter) A. Braun, *Chara coronata* Ziz., and *C. fragilis* Desv. were collected, the latter 2 for the 1st time in Chile.—J. A. Faris.

5051. COUPIN, HENRI. *Fungi*. *Album Gén. des Cryptogames* Fasc. 29-35. *Pl.* 182-236. [1922?].—The author completes the treatment of the Sphaeriales, presents the Laboulbeniaceae, and begins the consideration of the fleshy Basidiomycetes. [See also Bot. Absts. 10, Entry 585].—J. R. Schramm.

5052. KAUFFMAN, C. H. **A black rot of squash.** Rept. Michigan Acad. Sci. 22: 201-202. 1920.—Hubbard squashes (*Cucurbita maxima* Duchesne) in storage developed a dry rot in which the invaded tissues turned black and showed an abundance of dark brown mycelium. When grown in pure culture on synthetic sugar agar the mycelium remained sterile and lacked pigment; on corn-meal agar the mycelium became dark and pycnidia developed after 15 days. A healthy squash inoculated with a bit of mycelium from a pure culture developed the characteristic rot in a few days. The fungus is *Diplodina citrullina* Grossb., the pycnidial stage of *Mycosphaerella citrullina* Grossb.—Ernst A. Bessey.

5053. KAUFFMAN, C. H. **Collybia strictipes, developed in the laboratory.** Rept. Michigan Acad. Sci. 22: 203-204. 1920.—The fruiting bodies of the fungus appeared on a mass of wet, partially decayed leaf-mass filled with a whitish web of mycelium, when brought into the laboratory in October and kept wet for 2 months.—Ernst A. Bessey.

5054. KAUFFMAN, C. H. **Mortierella bainieri.** Rept. Michigan Acad. Sci. 22: 195-199. Pl. 16. 1920.—The mold under consideration was collected on forest leaves near Ann Arbor, Michigan. The cultural characters of the species are described in detail.—Ernst A. Bessey.

5055. KAUFFMAN, C. H. **The mycological flora of the higher Rockies of Colorado.** Papers Michigan Acad. Sci. 1: 101-150. Pl. 30-34. 1923.—This paper is an annotated list of the fungi collected by the author and companions near the continental divide in the mountains of Colorado in 1917 and 1920, mostly at elevations of 9000-10,000 feet. The fungi listed were mostly found in the forests. The following new forms are described: *Dasyscypha pulverulentum* (Lib.) Sacc. var. *fruticola* n. var., *Helotium alnicola* n. sp., *H. sulphuratum* (Schum.) Phil. var. *Piceae* n. var., *Hymenoscypha scutula* (Pers.) Phillips var. *Grossulariae* n. var., *Odontotrema minus* Nyl. f. *salicella* n. f., *Strickeria megastega* (E. & E.) n. comb. (*Teichospora megastega* E. & E.), *Boletus tomentosus* n. sp., *Collybia albiflava* (Pk.) Kauff. var. *montana* n. var., *Cortinarius bistreoides* n. sp., *C. citrinellus* n. sp., *C. glaucopodoides* n. sp., *C. griseoluridus* n. sp., *C. metarius* n. sp., *C. nigrocuspidatus* n. sp., *C. pinetorum* (Fr.) n. comb. (*C. argentatus* var. *pinetorum* Fr.), *Marasmius piceina* n. sp., *M. pinastris* n. sp., *Pholiota platyphylla* n. sp., *Stropharia squamosa* var. *subalpina* n. var., *Tricholoma tristiforme* n. sp.—Ernst A. Bessey.

5056. LENDNER, A. **Le Clathrus cancellatus Tourn. nouveau pour la flore mycologique Genevoise.** [Clathrus cancellatus Tourn. new for the mycological flora of Geneva.] Bull. Soc. Bot. Genève. 13: 29-30. 1921.

5057. MARTIN, CHARLES ED. **Une mise au point sur la nomenclature du Boletus aereus Bulliard.** [Certain facts concerning the nomenclature of Boletus aereus Bulliard.] Bull. Soc. Bot. Genève 13: 5-7. 1921.—*Boletus aereus* of the French mycologists is an entirely different species from *B. aereus* of the Central European mycologists. *B. aereus* of Krombholz, considered the type species by all mycologists except the French, is the *B. irideus* of Rostko-vius, which is only a subspecies of *B. edulis*, not a distinct species.—W. H. Emig.

5058. PONCY, R. **Un champignon nouveau pour la Suisse.** [A fungus (*Omphalia candida* Bresadola) new to Switzerland.] Bull. Soc. Bot. Genève 13: 20. 1921.

5059. YASUDA, A. **Notes on fungi (130).** Bot. Mag. Tokyo 37: (34)-(35). 1923. [In Japanese.]—*Polyporus Patouillardii* Rick, *Boletus griseus* Frost, and *Calocera cornea* (Batsch) Fries are discussed.—J. R. Schramm.

5060. YASUDA, A. **Notes on fungi (131).** Bot. Mag. Tokyo 37: (66)-(68). 1923. [In Japanese.]—*Pentophora glebulosa* (Fr.) Bres., *Dothidea puccinioides* (DC.) Fr., and *Trametes protracta* Fries are considered.—J. R. Schramm.

LICHENS

5061. LESDAIN, BOULY DE. *Lichens du Mexique (Etats de Puebla et Michoacan) recueillis par le Frère G. Arsène Brouard. Premier supplément.* [Mexican lichens collected in Puebla and Michoacan by Bro. Arsène Brouard. First supplement.] Brochure, 16 × 22 cm., 23 + 4 unnumbered p., mimeographed. Preface dated Covington, Louisiana, September, 1922.—The 1st 4 pages of this brochure are by Brother BROUARD and detail the circumstances of publication of the early list [see Bot. Absts. 7, Entry 372] of which this is a supplement, the occasion of the issue of the present list, and briefly outline the physiographic characters of the localities where collections were made. The body of the brochure, by Lesdain, lists 116 species, varieties, or forms of lichens and 4 of parasitic Basidiomycetes, with 1 page containing corrections in the earlier article mentioned above. There is full citation of localities and collector's numbers and a considerable body of references to earlier literature. The following novelties are proposed, authority in all cases being Bouly de Lesdain: *Aspercilla mixcoacensis*, *Acarospora Brouardi*, *Allarthonia mexicana*; *Heppia michoacanensis* var. *adnata*, *Endocarpon pallidum* var. *montanum*, *E. pusillum* var. *Arsenii*; *Evernia furfuracea* f. *ceratea* and f. *scobicina*, *Placodium mexicanum* f. *imbricata*, *P. murorum* f. *tectorum*, *Psora nigrorufa* f. *terrena*. *Placodium murorum* var. *radiatum* B. de L. (= *Lecanora* Hué) appears to be a new combination. There is additional descriptive matter or discussion relative to *Heppia Brouardi* B. de L., *H. leptopholis* Nyl., *Placodium murorum* var. *congestum* Flag., *F. saxorum* Flag., *F. bolacinum* Tuck., *F. interfulgens* Tuck., *Buellia tumida* Bagl., *Endocarpon pusillum* var. *minor* B. de L., *Staurothele clopina* Th. Fr., *Collema glaucophthalmum* Nyl., *C. texanum* Tuck., *Leptogium Hildbrandii* Nyl., and *Tromera Resinoe* Krb.—*E. B. Chamberlain.*

5062. MAMELI, EVA. *Contributo alla lichenologia del Forlivese.* [Contribution to the lichenology of Forli.] *Atti Ist. Bot. Univ. Pavia* III, 1: [1-22.] 1923.—About 200 species and varieties are listed, of which 128 are new to Emilia. No new species or names occur.—*J. R. Schramm.*

5063. OLIVIER, H. *Lichens du Chile determines.* [Catalog of the lichens of Chile.] *Bol. Mus. Nacion. Santiago* 11: 271-277. 1918/19 [1920].

BACTERIA

5064. ADAMS, F. O., and H. A. HARDING. *Test of commercial thionins for staining Frost little plates.* [Abstract.] *Absts. Bact.* 7: 23. 1923.—Thionin is found useful not only for staining colonies in plates but also for staining individual cells for microscopic examination.—*D. Reddick.*

5065. ALLEN, P. W. *Description of a method for determining the gelatin liquefying power of bacteria by a fluidity method: A substitution for solid gelatin plates.* [Abstract.] *Absts. Bact.* 7: 4-5. 1923.—The method is described in sufficient detail in the abstract to be duplicated.—*D. Reddick.*

5066. BENGTON, IDA A. *A toxin-producing anaerobe isolated from fly larvae.* [Abstract.] *Absts. Bact.* 7: 17. 1923.—The organism is called *Bacillus botulinus* type C. It resembles the 2 other types in its effect on animals, but the toxin which it produces is not neutralized by the antitoxins of the American strains known as types A and B.—*D. Reddick.*

5067. BENGTON, IDA A. *Classification of anaerobes producing toxins poisonous by mouth.* [Abstract.] *Absts. Bact.* 7: 17. 1923.—Three types of *Bacillus botulinus* are discussed.—*D. Reddick.*

5068. BERGEY, D. H. *Report of the committee on determinative bacteriology.* [Abstract.] *Absts. Bact.* 7: 2. 1923.

5069. BURKE, GEORGINA S. **The differential staining of live and dead spores of *Clostridium botulinum*.** [Abstract.] Absts. Bact. 7: 5. 1923.—Method: stain in steaming carbol-fuchsin, destain with absolute acetone, and counter stain with methylene blue. Living spores are stained only in the outer zone, whereas dead ones are stained throughout.—*D. Reddick*.

5070. BURKE, VICTOR, and MARY DUNNING. **A modified method for staining acid fast organisms and bacterial spores.** [Abstract.] Absts. Bact. 7: 5. 1923.—Technique: place slide in a beaker of steaming carbol-fuchsin for 2-5 minutes; wash in water without drying; decolorise in acetone until faintly pink: counter stain as usual.—For spores the process is as follows: stain in steaming carbol-fuchsin for 1 minute; wash in water without any drying; decolorize with 2-3 changes of acetone, leaving acetone on slide for 2 seconds at each change; counter stain as usual.—*D. Reddick*.

5071. CONN, H. J. **Methods of pure culture study. Report of committee on bacteriological technic.** [Abstract.] Absts. Bact. 7: 1. 1923.

5072. CONN, H. J. **Standardization of bacteriological apparatus. Report of committee on bacteriological technic.** [Abstract.] Absts. Bact. 7: 1. 1923.

5073. CONN, H. J. **Standardization of stains. Report of committee on bacteriological technic.** [Abstract.] Absts. Bact. 7: 1-2. 1923.

5074. DARLING, C. A. **Counting micro-organisms in tomato products.** [Abstract.] Absts. Bact. 7: 10. 1923.

5075. FROST, WILLIAM D., and FRED A. M. BACHMANN. **Hemolytic Streptococci in high grade milks.** [Abstract.] Absts. Bact. 7: 20. 1923.—In 18 per cent of the samples examined the alpha type was found and in 10 per cent the beta type occurred.—*D. Reddick*.

5076. ENLOWS, ELLA M. A. **A sugar-free medium for fermentation studies.** [Abstract.] Absts. Bact. 7: 8-9. 1923.—Procedure and formula are presented.—*D. Reddick*.

5077. EVANS, ALICE C. **A comparison of strains of the alpha type of *Streptococcus* from pathologic and from dairy sources.** [Abstract.] Absts. Bact. 7: 12. 1923.—“No characteristic was found which could distinguish the 2 groups.”—*D. Reddick*.

5078. GRAHAM, ROBERT, and I. B. BOUGHTON. **A spontaneous disease of chickens and ducks associated with a toxic anaerobe.** [Abstract.] Absts. Bact. 7: 29-30. 1923.—The organism, which is described in some detail seems to be *Clostridium botulinum* type C of Bengtson [see Bot. Absts. 12, Entry 5066].—*D. Reddick*.

5079. HAMMER, B. W., and MERLE P. BAKER. **Studies on the *Strep. paracitrovorus* group.** [Abstract.] Absts. Bact. 7: 12-13. 1923.—*Streptococcus paracitrovorus* represents a group of organisms, widely distributed in dairy products, the most striking characteristic of which is the fermentation of citric acid. Certain variations exist but data are not yet available justifying a division into types.—*D. Reddick*.

5080. HULL, THOMAS G., and HUGH CASSIDAY. **Preserved cultures in the Widal test.** [Abstract.] Absts. Bact. 7: 3-4. 1923.

5081. JONES, DAN H., and J. GIBBARD. **Microbiological investigation of sweet clover silage.** [Abstract.] Absts. Bact. 7: 20-21. 1923.—“Bacterial, yeast and mold determinations were made before, during, and after the period of fermentation of 6 lots of sweet clover [*Melilotus alba*?] silage ensiled at different dates from June 1st to July 20th, 1922.”—*D. Reddick*.

5082. KELSER, R. A. The identification of *Bacillus botulinus* and its toxin in culture and in canned foodstuffs by serological methods. Amer. Jour. Public Health 13: 366-376. 1923.—“Culture of *B. botulinus*, either in a pure or contaminated state, can be identified by means of complement-fixation titrations,” the details of which are given.—C. A. Ludwig.

5083. KOSER, STEWART A. *Bacillus Welchii* in bread. [Abstract.] Absts. Bact. 7: 10-11. 1923.—A strain of the organism of a low grade of virulence was found to be the active gas producer in a commercial “salt rising” bread “starter.” The organism was isolated from baked loaves.—D. Reddick.

5084. KOSER, STEWART A. Utilization of organic acid salts by the colon-aerogenes group. [Abstract.] Absts. Bact. 7: 8. 1923.—“It is believed that the salts of the commoner organic acids are entitled to a wider use by bacteriologists than that accorded them at present. Such compounds should form a valuable series of test substances in the differentiation and classification of bacterial groups.”—D. Reddick.

5085. KULP, WALTER L. Casein digest media for growing *Lactobacillus acidophilus* and *Lactobacillus bulgaricus*. [Abstract.] Absts. Bact. 7: 9. 1923.

5086. KULP, WALTER L., and LEO F. RETTGER. A comparative study of the fermentative action of *Lactobacillus bulgaricus* and *Lactobacillus acidophilus*. [Abstract.] Absts. Bact. 7: 16-17. 1923.—“The only sharp difference between the fermentative action of these 2 groups of aciduric organisms is their action on a medium containing pure levulose, and the degree of acidity produced in milk and other carbohydrate media.”—D. Reddick.

5087. LEVINE, MAX, and D. C. CARPENTER. On gelatin liquefaction of bacteria. [Abstract.] Absts. Bact. 7: 4. 1923.

5088. MELLON, RALPH R. Observations on the relation of bacterial giant coccoids to zygospore formation. [Abstract.] Absts. Bact. 7: 18. 1923.—A pleomorphic form, *Bacillus* sp., was studied. “Employing an environment that led the strains to reproduce in their fungoid or branching phase, a mechanism was demonstrated that was practically identical morphologically with zygospore formation as it occurs among the yeasts.”—D. Reddick.

5089. MOON, M. P. Certain non-spore forming rods found in raw milk. [Abstract.] Absts. Bact. 7: 25. 1923.

5090. MOUNCE, MARION J. A capsulated slime-forming strain of *Bacterium cloacae*. [Abstract.] Absts. Bact. 7: 18. 1923.

5091. PALMERLEE, C. A. Albert's toluidin blue as a routine stain for diphtheria bacilli. Amer. Jour. Public Health 13: 363-365. 1923.—This stain differentiates diphtheria bacilli from all other bacteria. It seems also to differentiate virulent and non-virulent forms, although the data at hand are insufficient to permit a positive statement.—C. A. Ludwig.

5092. ROBERTSON, A. H. A preliminary report of the bacterial flora of milking machines. [Abstract.] Absts. Bact. 7: 19-20. 1923.

5093. RODRIGUEZ, F. E. Studies on the specific bacteriology of dental caries. [Abstract.] Absts. Bact. 7: 28. 1923.—*Bacillus odontolyticus* is proposed as the name for a group of high acid producing bacteria which cause lesions in teeth.—D. Reddick.

5094. STURGES, WILLIAM S. A modification of the blood-agar plate. [Abstract.] Absts. Bact. 7: 4. 1923.

5095. STURGES, WILLIAM S. Studies on halophylic micro-organisms. The flora of meat curing solutions. [Abstract.] Absts. Bact. 7: 11. 1923.

5096. WARTHIN, A. S., E. BUFFINGTON, and R. C. WANSTROM. A study of rabbit spirochetosis. Jour. Infect. Diseases 32: 315-332. Pl. 1-12, fig. 1-24. 1923.—Investigations on the spontaneous spirochetosis of rabbits led the authors to the conclusion that *Treponema cuniculi*, which is responsible for the disease, is distinct from *Treponema pallidum*. These 2 organisms of similar appearance differed morphologically and could be distinguished by staining. The Wassermann reaction was negative for rabbits infected with the organism.—R. L. Starkey.

5097. WELDIN, JOHN C., and MAX LEVINE. An artificial key to the species and varieties of the colon-typhoid or intestinal group of bacilli. [Abstract.] Absts. Bact. 7: 13-16. 1923.

5098. WHITING, W. A. The relation between utensil contamination and the clumping of bacteria in market milk. [Abstract.] Absts. Bact. 7: 19. 1923.

5099. YATES, J. W. Pin point colonies in plates from pasteurized milk. [Abstract.] Absts. Bact. 7: 24. 1923.

5100. ZOLLER, HARPER F. The value of milk powder agar in the bacteriological laboratory. Amer. Jour. Public Health 13: 384-387. 1923.—This agar is easily prepared, gives higher counts for all milk products than the standard agar, and serves as a means of detecting both acid forming and proteolytic-enzyme forming organisms.—C. A. Ludwig.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See also in this issue Entries 4851, 5038)

5101. ANONYMOUS. The distribution of life in the southern hemisphere and its bearing on Wegener's hypothesis. Nature 111: 131. 1923.—This is an extract from a recent discussion before the Royal Society of South Africa. "Prof. Compton regards the botanical evidence as completely opposed to Wegener's theory. Dr. DuToit regards the paleobotanical evidence as too fragmentary."—O. A. Stevens.

5102. BERRY, EDWARD W. Miocene plants from southern Mexico. Proc. U. S. Nation. Mus. 62¹⁹: 1-27. Pl. 1-7. 1923.—This article describes 33 species of Miocene plants from the Isthmus of Tehuantepec in southern Mexico. These comprise 2 ferns, 1 monocotyledon, and 30 dicotyledons, all of which are new except species of *Ficus*, *Nectandra*, *Goeppertia*, and *Guetarda*. The facies is that of tropical lowlands and is distinctly South American in affinities. Following are the new species: *Gymnogramme Wadiei*, *Acrostichum mexicanum*, *Coussapoa veracruziana*, *Anona saraviana*, *Moquillea mexicana*, *Connarus carmenensis*, *Anacardites lanceolatus*, *Liquidambar incerta*, *Inga miocenica*, *Dioclea* (?) *mexicana*, *Leguminosites mexicanus*, *L. oaxacensis*, *Fagara Wadiei*, *Drypetes elliptica*, *Cedrela miocenica*, *Simaruba veracruziana*, *Gouania miocenica*, *Nectandra tehuntepecensis*, *Mespilodaphne palomarensis*, *Myrcia saraviana*, *Lecythydophyllum couratarioides*, *Melastomites angustus*, *M. obovatus*, *Apocynophyllum mexicanum*, *Allamanda carmenensis*, *Crescentia cucurbitinoides*, *Bignonioides orbicularis*, and *Rondeletia* (?) sp.—E. W. Berry.

5103. CUNO, J. B. The mystery of a buried forest. Amer. Forest. 29: 105-106. 1 fig. 1923.—This article concerns the discovery of a prehistoric cypress swamp in Washington, D. C., which geologists claim is the remains of a forest dating back 30,000-100,000 years. The writer believes that the trees were felled by the early settlers of the region and removed for use in building construction elsewhere, since no trunks of trees were found during the excavation.—Chas. H. Otis.

5104. GOTHAN, W. Ein Fund natürlicher Zellulose im Miocän des Niederlausitzer Braunkohlenreviers. [The discovery of unaltered cellulose in the Miocene of the Niederlausitz brown coal district.] Zeitschr. Deutsch. Geol. Ges. 74: 159-161. 1922.—The author reports the presence of unaltered cellulose, as determined chemically, in unidentified wood from the Miocene brown coal of Niederlausitz.—E. W. Berry.

5105. GOTHAN, W., und K. NAGALHARD. Kupferschieferpflanzen aus dem niederrheinischen Zechstein. [Copper shale plants from the lower Rhein Zechstein.] Jahrb. Preuss. Geol. Landes. 42¹: 440-460. Pl. 5-7. 1922.—The following species are recorded from the Zechstein of the lower Rhein region and the indicated environmental conditions are discussed. All the plants are new to this horizon in the Permian: *Ulmannia Bronni* Goeppert, *U. frumentaria* (Schlot.) Goeppert, *U. Solmsi* new name, *Voltzia* sp., *Callipteris Martinsi* (Germar) Zeiller, *Sphenopteris Kukukiana*, and *S. Gibbelsi* n. sp.—E. W. Berry.

5106. HOWE, M. A. Two new Lithothamnieae, calcareous Algae, from the lower Miocene of Trinidad, British West Indies. Proc. U. S. Nation. Mus. 62²⁴⁵³: 1-3. Pl. 1-4. 1922.—*Lithothamnium pennyi* and *Lithophyllum trinitense* are discussed as new.—E. W. Berry.

5107. KRYSHTOFOVICH, A. N. Report on the results of studies in Japan 1919-1920. Rec. Geol. Comm. Russian Far East 13. 1-12. 1921.—This is an account in Russian of the author's paleobotanical studies in Japan in the years mentioned.—E. W. Berry.

5108. KRYSHTOFOVICH, A. N. Some Tertiary plants of Possiet Bay, southern Ussuri District, collected by Mr. E. Ahnert. Rev. Geol. Comm. Russian Far East 11. 1-32. Pl. 1-3. 1921.—This is an account in Russian of the Eocene flora from this district in eastern Siberia. None of the species is new, but some are recorded from this region for the 1st time.—E. W. Berry.

5109. KRYSHTOFOVICH, A. N. Tertiary plants from Amagu River, Primorskaya Province, discovered by Mr. A. Kuznetsoff. Rec. Geol. Comm. Russian Far East 15. 1-15. Pl. 1-3. 1921.—This account in Russian records and illustrates 16 species of plants from the Eocene of eastern Siberia.—E. W. Berry.

5110. LAKE, PHILIP. Wegener's hypothesis of continental drift. Nature 111: 226-228. 1923.—The hypothesis is based on the idea that the continental masses are patches of lighter rock moving upon a denser one which forms the floor of the ocean. One of the chief arguments is that the frequencies of heights above sea level and depths below sea level show well marked maxima at 100 and 4700 m. respectively. Wegener concludes that 2 distinct surfaces standing at these altitudes must have been involved in the subsequent movements, and that according to mathematical laws a deformation of a single level would not produce such maxima. G. V. Douglas in a paper to appear in the Geological Magazine shows that the actual frequency curve is consistent with ordinary geological conceptions and does not require the original existence of 2 surfaces.—Wegener imagines that at the close of the Carboniferous period the upper layer formed one continuous patch covering about $\frac{1}{2}$ the globe. The *Glossopteris* flora of India is found also in Australia, the Falkland Islands, the Antarctic continent, and in South America. In Wegener's reconstruction these are brought together. But this flora also is found in Kashmir, northwestern Afghanistan, northeastern Persia, Tonquin, northern Russia and Siberia. These areas are widely separated from the other by Wegener. The writer discusses geological features further, concluding that the 2 sides of the Atlantic could not have been united as was suggested by Wegener.—O. A. Stevens.

5111. NOÉ, A. C. Coal balls. Science 57: 385. 1923.—The writer seeks information concerning deposits of coal balls which, though not previously reported in North American coal seams, are here reported from Illinois, Kentucky and Texas.—C. J. Lyon.

5112. SEWARD, A. C. **A study in contrasts: The present and past distribution of certain ferns.** Jour. Linn. Soc. Bot. 46: 219-240. Pl. 16-19. 1922.—The author discusses the present and past distribution of the fern families Gleicheniaceae, Matonieae, Dipteridinae, Schizaeaceae, and Marattiaceae as understood by him and illustrated by maps.—E. W. Berry.

5113. TORREY, RAY ETHAN. **The comparative anatomy and phylogeny of the Coniferales, Part 3.—Mesozoic and Tertiary coniferous woods.** Mem. Boston Soc. Nat. Hist. 6: 41-106. Pl. 8-15. 1923.—Diagnoses are given of the following lignitic woods: *Dadoxylon* sp., *Voltzi-oxylon documense* n. gen. & sp., *Pitoxylon* sp., *P. scituatensiforme* n. comb., *P. cf. Vateri* Platen, *Pseudotsuga annulata* n. comb., *Podocarpoxylon texense* n. sp., *P. washingtonense* n. sp., *P. McGeei*, *P. dakotense* n. sp., *Sequoioxylon montanense* n. gen. & sp., *S. dakotense* n. sp., *S. laramense* n. sp., *S. Burgessii* n. comb., *Brachyoxylon Woodworthianum* n. sp., *B. raritanense* n. sp., *B. comanchense* n. sp., *Paracupressinoxylon cupressoides* n. comb., *P. trinitense* n. sp., *Metacupressinoxylon cedroides* n. gen. & comb., *Telephragmoxylon brachyphyloides* n. sp., *T. comanchense* n. sp. *Araucarioxylon texense* n. sp.—This is the most extended study of lignitic woods since the description of the Cretaceous conifers of Kreischerville, Staten Island, by Hollick and Jeffrey in 1909. The "nitro-cellulose" method is used, and the photomicrographs (64 in number) show that the lignites are at last amenable to study.—Most of the stems described were collected by the writer himself, and notes are given on the geographic and geologic occurrence of the lignites of the U. S. A.—A histologic key to the lignitic woods of the U. S. A. is given, modified from earlier keys of Goeppert as developed by Stopes and Gothan. Attention is called to the fact that the species of Araucariaceae are becoming numerous, and render some form of classification necessary. Hollick and Jeffrey's *Araucariopityoideae*, *Brachyphyloideae*, and *Araucarioideae* are raised to the rank of tribes; i.e., a great Araucarian facies, especially well attested in the Cretaceous and earlier, spread far to the North, though later to be restricted to the Southern Hemisphere in sharply limited numbers. And side by side with this facies flourished the cosmopolitan pines and their relatives in even greater variety, likewise undergoing restriction in form, in habit, and in number. While on the borders of these 2 dominant forest-making elements were many and striking intermediate types. Of such the most interesting must be the *Brachyoxylon Woodworthianum* from the Cretaceous of Martha's Vineyard, since the earliest formed tracheids are close, to even *Dadoxylon* pitted; while later pitting is more Abietineous, but without bars of Sanio. Despite the Abietineous features the species is so much like an Araucarian that it must be referred to that group.—A new genus held still nearer to *Araucaria* is *Telephragmoxylon*, thus defined: annual rings slight, traumatic resin canals, uniseriate to partly biseriate, wood rays 2-16 cells deep, few to 10 slits or "oculipores" per tracheid field; pitting in young wood uniseriate, in older wood often biseriate, and then alternate contiguous or sometimes in 2 slightly separated rows; wood parenchyma none.—The conclusion reached from these border types is that the Araucarians sprang from the Abietae in early Mesozoic time and have since been undergoing simplification. The stem of this Abietean line is the Triassic *Woodworthia* of Jeffrey with araucaroid wood and short shoots. Reversing the more usual view of the gymnosperm phylum, this also becomes a finding in open court against the tendency of the past few years to belief in a more profound parallelism, with the exact lineal ancestry seldom observed. Consonant with an Abietineo-Araucarian line, and more primitive than any of the present gymnosperms, except the cycads, *Ginkgo* is considered a "living Cordaite," only less emphatically called by Darwin a "living fossil." From the pines (Abietae) later arose the further simplified Cupresseae, and also the Taxodiae or Sequoidae.—Two definitions of handy use in the anatomy of the conifers remain to record. Gothan used the expression "Kreuzungsfeld," Lignier, "aire mitoyenne," and Stopes, "tracheid-field," for the portion of a tracheid subtended by a ray cell. The pits seen in the fields, or along the tracheid surface, have been gradually modified until the old slit or "oculipore" (conventional form of an eye) becomes a round borderless opening, often large, the "oöpore."—G. R. Wieland.

5114. WHITE, D., and T. STADNICHENKO. **Some mother plants of petroleum in the Devonian black shales.** Economic Geol. 18: 238-252. Pl. 5-9. 1923.—The authors describe the alga

Foerstia ohioensis n. sp. and the spore sacs *Protosalvinia ravenna* n. sp. which are very abundant in the black shales and which contain both waxy and resinous compounds, as determined experimentally; and consider them, in conjunction with the waxy-resinous exines of *Sporangites*, as the probable source of petroleum.—*E. W. Berry*.

5115. WINCHESTER, DEAN E. Oil shale of the Rocky Mountain region. U. S. Geol. Surv. Bull. 729. 204 p. 1923.—This comprehensive work contains a list of plants of the Green River formation (middle Eocene) prepared by F. H. KNOWLTON; and notes on the microorganisms of the oil shales by the late C. A. DAVIS, with figures of various algae, pollen, fern annulus, etc.—*E. W. Berry*.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 4741, 4795, 4796, 4907, 4927, 4981, 4997, 5000, 5003, 5006, 5007, 5008, 5010, 5015, 5023, 5026, 5028, 5029, 5039, 5050, 5052, 5180, 5226, 5233, 5251, 5270, 5272)

DISEASES CAUSED BY FUNGI

5116. ANONYMOUS. Pins sylvestres attaqués par *Armillaria mellea*. [*Pinus sylvestris* attacked by *Armillaria mellea*.] Bull. Soc. Centrale Forest. Belgique 28: 628-630. 1921.—A Belgian forest owner sent in specimens of 8-year-old *Pinus sylvestris* killed by a fungus. The latter was identified as *Armillaria mellea* and the identifying characteristics are given.—*H. T. Gisborne*.

5117. ANONYMOUS. [Rev. of SCHWARZ, MARIE B. Das Zweigsterben der Ulmen, Trauerweiden, und Pfirsichbäume. (Dying of elms, weeping willows and peach trees.) Thesis, University of Utrecht, 73 p., 7 pl., 15 fig. 1922]. Rev. Applied Mycol. 2: 92-94. 1923.—In the case of die-back of elms, cultures from fragments of discolored wood taken from the interior of larger limbs constantly yielded a Graphium-like fungus which gave positive results from artificial inoculation. The author describes this fungus as *Graphium Ulmi* n. sp.—Detailed description is given of the "bark scorch" disease of *Salix alba* var. *vitellina pendula* S. upon which the fungus *Fusicladium saliciperdu* was predominant. Other fungi were also present and a Phoma which gave positive results from inoculation tests is named *Phoma intricans* n. sp. Dying of the shoots in autumn after defoliation was found due to the wound parasite *Discella carbonacea* as shown by infection trials.—Several fungi are concerned in the die-back of peach shoots common in Holland, but only *Monilia cinerea* is a true parasite. However, the author believes *Botrytis cinerea* to be responsible for the dying back of peach shoots, especially in greenhouses. Three strains of *Cytospora Prunorum* Sacc. & Syd. were also isolated and 2 of them gave infection after artificial inoculation. The 3rd, however, sometimes infected weeping willow and is considered a different physiological strain from the other 2.—*Frederick V. Rand*.

5118. ALLYN, O. M. Reducing corn root-rot by careful hand selection of seed. Jour. Amer. Soc. Agron. 15: 73-76. 1923.—Hand selection, even the 1st year, materially reduces the corn-root disease.—*F. M. Schertz*.

5119. BEACH, W. S. A crown rot of rhubarb caused by *Phytophthora cactorum*. Pennsylvania Agric. Exp. Sta. Bull. 174. 28 p., 25 fig. 1922.—Part I contains facts of general interest concerning this disease, characterized by a brown necrosis of roots, crown, and base of petioles. Outer leaves usually wilt first and this may extend to all leaves and result in their death. Sometimes the disease affects only 1 or 2 buds on the crown, the rest of the plant remaining healthy unless wet weather intervenes. The rapid progress of the disease and the discoloration of the buds serve to distinguish this disease from minor crown troubles. The severest losses occur in new plantings from crowns taken from infested fields. The loss in old fields is not

great from year to year unless long periods of warm, wet, and cloudy weather occur during July and August. New fields should be started only from crowns taken from healthy fields or from seedlings grown under disease-free conditions. Spraying with 8-8-100 Bordeaux mixture was started after the close of the pulling season in 1921 and clearly indicated that it restricted the spread of the disease during the remainder of the summer. The spray does not kill the parasite already established in the crowns. Roguing as early in the season as the diseased hills can be detected appears to be an important control measure. It is also recommended that in setting new fields with roots from old fields the roots be disinfected with HgCl_2 1:1000, or formaldehyde 1:240 for 30 minutes.—Part II is concerned with the more technical phases of the problem. The crown rot caused by *Phytophthora cactorum* is similar to "foot rot," caused by *P. parasitica* var. *Rhei* as described by Godfrey, and an undescribed *Phytophthora* "root rot" of rhubarb in southern Illinois. The crown rot here described appears to be more northern in distribution and the fungus causing it has an optimum temperature requirement of 25°C. *in vitro*. *P. parasitica* var. *Rhei* has an optimum temperature requirement of about 30°C. and the Illinois *Phytophthora* sp. reacts to temperature ranges in about the same manner. Both parasites appear to be more southern in their distribution. Pathogenic proof of *P. cactorum* from rhubarb, *P. parasitica* var. *Rhei* from rhubarb, *P. sp.* from rhubarb in Illinois, and *P. cactorum* from apple was established upon rhubarb by inoculating seedlings at various seasons with bits of test tube culture material. *P. cactorum* from rhubarb infects uninjured leaves and petioles under favorable conditions but infection of the crown and roots appears dependent upon wounds. Such wounds are afforded by the pulling of the stalks. *P. parasitica* var. *Rhei* appears able to infect more readily in the absence of wounds, as does the *Phytophthora* from Illinois. *P. cactorum* from apple infects rhubarb through wounds but with less readiness than any of the other organisms, indicating that this strain is not so readily adapted to parasitism on this host. All tissues of rhubarb exhibiting symptoms of crown rot are invaded by the mycelium. In the early stages of infection the mycelium is intercellular with lateral haustoria piercing the adjacent cells. In later stages the mycelium not infrequently develops within the cells. Generally the hyphal strands lie parallel with the longitudinal axes of the cells. However, in the region of the medullary rays the hyphae develop radially and by following these "rays" the fungus appears to be able to penetrate more deeply into the tissues of the root than is the case in petioles, where the development is more rapid in a longitudinal direction and the medullary rays are absent. Oospores of *P. cactorum* from rhubarb develop abundantly *in vitro* but have been observed only once each in petioles and crowns. Zoosporangia are developed abundantly during moist weather upon the surface of petiole spots, emerging in fascicles from the stomata. Tabulated effects of temperature and media upon the 3 species of *Phytophthora* from rhubarb together with measurements of oospores and conidia are included. The conidia of *P. cactorum* from rhubarb may germinate either by zoospores or by producing germ tubes directly. A bibliography is appended.—C. R. Orton.

5120. ELLIOTT, JOHN A. Cotton-wilt, a seed-borne disease. Jour. Agric. Res. 23: 387-393. Pl. 1-2. 1923.—Experimental data by plate culture methods and subsequent inoculation tests to prove pathogenicity show that *Fusarium vasinfectum* of cotton is at times carried within the seed coat.—Spores of the organism on the surface of seed may retain vitality for at least 5 months.—D. Reddick.

5121. ERIKSSON, JAKOB. Beizversuche mit Uspulun und Supersolfo gegen den Steinbrand des Weizens. [The treatment of bunt smut of wheat with uspulun and supersolfo.] Zeitschr. Pflanzenkrankh. 32: 289-293. 1 fig. 1922.—Uspulun is a dirty grey powder manufactured and sold by Friedr. Bayer and Co., Leverkusen, near Cologne. The principal constituent is "Chlorphenolquecksilber," to which a coloring agent is added to prevent mistaking treated grain for untreated.—Supersolfo is a thick, heavy, dark fluid manufactured by the San Paolo gas works of Rome, a by-product obtained in the purification of gas after Bruttini's method. The principal constituent is sulphide of lime.—The experimental plots were 1 square m. in area, the control plot in the center and $\frac{1}{2}$ m. from the others.—Fifty gm. of wheat arti-

ficially "sooted" with spores were used on each plot. The grain was immersed in aqueous solutions (uspulun, 2.5 gm. to 1 l., supersulfo, 10 cc. to 1 l.) for 1 hour, occasionally stirred, the liquid drained off, and the grain dried.—The plots were sown Sept. 12, harvested Aug. 19 following. Results, so far as number and weight are concerned, are given in a table from which it is seen that the control gave 83.8 per cent, supersulfo 22.6 per cent, and uspulun 0.5 per cent of diseased plants. Uspulun proved most effective, being for all practical purposes an absolute fungicide.—It is, however, highly important to observe the superiority of supersulfo over uspulun as far as the yield increase is concerned. Both treatments gave increased yields, indicating their fertilizing value, supersulfo acting the more favorably of the 2 in this respect.—*H. T. Güssow.*

5122. HURD, ANNIE MAY. Hydrogen-ion concentration and varietal resistance of wheat to stemrust and other diseases. Jour. Agric. Res. 23: 373-386. 1923.—The varieties of wheat resistant to stemrust (*Puccinia graminis tritici* Pers.) employed in the test were: Kanred, Pentad, Khapli, Kota, Mindum, and Iumillo; susceptible varieties: Turkey, Kharkov, Little Club, Preston, Arnautka.—There is no significant difference in the H-ion concentration of juices expressed from resistant and from susceptible varieties. Greater differences are found in a single variety when subjected to differing environmental conditions. The pH value of expressed juice from plants harvested at 1 o'clock in the afternoon is 0.1 higher than from similar plants harvested 4 hours earlier. Juice from plants grown in limed soil has a lower H-ion concentration than that from plants grown in unlimed soil. Plants of unhealthy appearance show abnormally high acidity of expressed juice while plants affected with *Erysiphe graminis* are more acid than healthy ones and, perhaps, for the same reason. Geographic source of seed does not affect the H-ion concentration of the juice of plants.—A compilation of data from various sources shows that there is no correlation between the H-ion concentration of the expressed juices of these varieties of wheat and their resistance or susceptibility to diseases caused by the following organisms: *Puccinia graminis Tritici*, *P. triticea*, *P. glumarum Tritici*, *Tilletia Tritici*, *Urocystis Tritici*, *Gibberella Saubinetii*, *Erysiphe graminis*, and *Tylenchus Tritici*.—*D. Reddick.*

5123. KASAI, MIKIO. Kurze Mitteilung über den auf der Binse parasitisch lebenden Pilz *Cercosporina juncicola* sp. n. [Note on *Cercosporina juncicola* sp. n. parasitic on *Juncus effusus* var. *decipiens*.] Japanese Jour. Bot. 1: 105-110. 1923.—A stem spot disease of *Juncus* has been known for nearly 20 years in Bingo Province, western Japan; but its cause remained unknown until the author proved as a result of 2 years of study that it is due to *Cercosporina juncicola* Hori & Kasai sp. n. The fungus usually attacks half-grown plants just below the middle of the stem; the spots, which are very small and brownish at first, later enlarge and become sunken. These spots are variable in size and shape, and may be elliptical, circular, or without definite form. A detailed description of the fungus is given. Preventive measures have not yet been worked out, but the planter is urged to set out sound stock only and in doubtful cases to disinfect the stalks but not the roots with Bordeaux mixture. [See also following entry].—*Lillian C. Cash.*

5124. KASAI, MIKIO. Über den auf der Binse parasitisch lebenden Pilz *Cercosporina juncicola* sp. n. [*Cercosporina juncicola* parasitic on *Juncus*.] Ber. Ohara Inst. Landw. Forsch. 2: 225-232. Pl. 10-12. 1922.—The author describes a disease of *Juncus effusus*, L. var. *decipiens* Buch., a plant which in Japan is used in the mat industry. The fungus attacks half-grown plants causing gray spots which become very conspicuous after the stems are dry. The presence of the fungus on stems materially lessens their value for making mats. On the basis of morphology the author designates the fungus as a new species. Certain recommendations are made for field sanitation and disease control. [See also preceding entry].—*Margaret Buwens.*

5125. NISIKADO, Y., and C. MIYAKE. Studies on the helminthosporiose of the rice-plant. Ber. Ohara Inst. Landw. Forsch. 2: 133-195. Pl. 3-9. 1922.—This disease, which is serious and widely distributed in Japan, is caused by *Helminthosporium Oryzae* Breda de Haan.

It attacks all parts of the rice plant in all stages of development, and is characterized by brownish leaf-spots and a velvet-like blackening of the culms and glumes. Cultures of the fungus were isolated from different parts of the plant and were grown in rice agar and other culture media, the writers observing particularly the mode of anchorage of the germ tube, the formation of the appressoria, the penetration of the host epidermis, and the effect of the advancing mycelium on the host cells. Penetration may take place either through open stomata or by breaking through the epidermal cells by means of appressoria. Infection hyphae are formed at the tips of the germ tubes. The minimum temperature for the germination of conidia is 2°C. and the maximum 41°C.; the optimum for both germination and mycelial growth is 25-30°C.—Extensive experiments were also conducted to test the germicidal effect of various chemicals on the conidia, mercuric chloride, silver nitrate, copper sulphate, calcium hypochloride, formaldehyde, and phenol proving highly effective. Disinfection of seed with one of these is suggested as a means of control. The taxonomy of the fungus is discussed and a bibliography is given.—*Margoret Buwens.*

5126. REMY, TH., and J. VASTERS. Untersuchungen über die Wirkung von Chlorphenol-Quecksilber, Sublimat und einigen anderen Pflanzenschutz- und Desinfektionsmitteln. [Studies on the action of mercury-chlorphenol, sublimate, and several other substances used for plant protection and disinfection.] Landw. Jahrb. 58: 379-480. Fig. 21-25, 37 tables. 1923.—A detailed study is made of chlorphenol-mercury compound and other disinfectants, including formaldehyde, mercuric chloride, and copper sulphate, for seed treatment against rust and smut spores and against other fungus diseases. A 0.5:1000 concentration of chlorphenol-mercury was sufficient against a moderate infection of wheat with rust, but in the case of strong infection a concentration of 1.5-2.0:1000 was required. Mere moistening of seed with this solution was insufficient for protection. A 0.5:1000 solution proved very efficient against *Fusarium*. The action of the disinfectant against *Gloeosporium lindemuthianum* and *Ascochyta Pisi* proved of doubtful value. The disinfectant compares favorably with formaldehyde, mercuric chloride, and copper sulphate in its influence on seed germination.—*S. A. Waksman.*

DISEASES CAUSED BY BACTERIA

5127. JOHNSON, JAMES. A bacterial leafspot of tobacco. Jour. Agric. Res. 23: 481-493. Pl. 1-4. 1923.—Leaves of tobacco [*Nicotiana tabacum*] of any age may be affected but lesions occur more commonly on the lower ones. The lesions are circular to oblong and vary from 1 mm. to 1 cm. in diameter except through coalescence. The young lesions usually are surrounded by a chlorotic halo.—The bacterial diseases wildfire and angular leafspot have been studied in comparison but "Wisconsin bacterial leafspot" is found to be different. The causal organism is named *Bacterium melleum* n. sp. Its morphological and cultural characters are described in detail, and its group number, according to the system formerly recommended by the American Society of Bacteriologists, is given as 221.3333633.—Infection has been secured artificially only through needle punctures and it is concluded from this and from cultural studies that the organism is not a vigorous parasite but is rather one requiring special conditions for natural infection. High humidity and possibly fairly high temperature are required for infection but these requirements in themselves are not sufficient to insure infection.—Test plats treated with barnyard manure showed 45 per cent diseased plants as compared with 10 per cent on chemically manured plats, thus indicating a predisposing factor that affects occurrence and prevalence.—*D. Reddick.*

5128. KENDALL, ARTHUR ISAAC. Bacterial parasitism, bacterial pathogenism, and resistance to bacterial infection. Jour. Infect. Diseases 32: 341-354. 1923.—Ehrlich's humoral theory and Metchnikoff's cellular theory of immunity are discussed. The differences between the 2 theories are indicated and their relationships respectively to pathogenic and parasitic organisms are pointed out. The author compares the life cycles of these 2 groups of organisms with respect to their host, man.—*R. L. Starkey.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

5129. FERRIÈRE, CH[ARLES]. *Entomologie économique. Les problèmes modernes de la lutte contre les insectes et leur application en Suisse.* [Economic entomology. Modern problems of insect control and their application in Switzerland.] 36 p. Ernest Bircher: Berne, 1922.—This paper includes a discussion of agricultural, horticultural, forest, veterinary and medical, industrial and commercial entomology; entomology and the public economy; and entomology in Switzerland.—A bibliography of 2 pages is appended.—*Frederick V. Rand.*

5130. JORDAN, K. H. C. *Die tierischen Schädlinge des Gemüse-, Obst- und Blumengartens und ihre Bekämpfung. Ein Lehrbuch für alle Gartenfreunde.* [The animal enemies of the vegetable, orchard, and flower garden. A handbook for all garden lovers.] xii + 266 p., 88 fig. Oskar Leiner: Leipzig, 1922.—This is a popular handbook discussing, under host groups and specific hosts, the animal parasites of plants.—*Frederick V. Rand.*

5131. NIESCHULZ, OTTO. *Unsere bisherigen Kenntnisse von der Flagellatenkrankheit der Pflanzen.* [Our present knowledge of the flagellate disease of plants.] *Zeitschr. Pflanzenkrankh.* 32: 102-108. 3 fig. 1922.—This recapitulation of present knowledge of flagellates causing plant disease deals mainly with those found in the latex of Euphorbiaceae. Useful literature references are appended.—*H. T. Güssow.*

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

5132. DOOLITTLE, S. P., and M. N. WALKER. *Cross-inoculation studies with cucurbit mosaic.* *Science* 57: 477. 1923.—In addition to nearly all members of the Cucurbitaceae, the following species have been proved susceptible to this disease: *Martynia louisiana*, *Capiscum annuum* (pepper), *Asclepias syriaca*, *Phytolacca decandra*, *Amaranthus retroflexus*, *Physalis* sp., potato, and tobacco.—*C. J. Lyon.*

5133. GAGET, J. *La dégénérescence des pommes de terre.* [Degeneration of the potato.] *Jour. Agric. Pratique* 35: 316-318. 1921.—The author writes of the connection of aphids with diseases of degeneration such as leaf roll and mosaic and of the difficulty of aphid elimination, and notes the presence of eggs on such diseased tubers, which carry insects through the winter. He asks for a remedy in which seed tubers may be immersed to kill aphid eggs.—*J. P. Kelly.*

DISEASES OF UNKNOWN CAUSE

5134. HINTIKKA, T. J. *Die "Wisa"—Krankheit der Birken in Finnland.* [The "Wisa" disease of birches in Finland.] *Zeitschr. Pflanzenkrankh.* 32: 193-210. 1922.—"Wisa" wood obtained from "Wisa" birches is a wood of abnormally wavy or undulating grain similar to what is known in America as birds' eye wood, or resembling structures such as are found in burls, burl being perhaps the most suitable interpretation of the term "Wisa." Such wood is used in cabinet making.—The author has investigated claims that this abnormality is brought about by fungi, and is of the opinion that the phenomenon is not of parasitic origin, but due to external, climatic, or soil conditions. The changes in structure are said to be caused by an internal gummosis, in which neither cell walls nor contents are dissolved.—*H. T. Güssow.*

5135. KEUCHENIUS, P. E. *Kringrot, een nieuwe Ziekte van Hevea.* [Ringrot, a new disease of Hevea.] *Arch. Rubbercult.* 4: 495-496. 1920.—The disease is common in Sumatra and affects only the outer portion of the bark, which in late stages of the disease dries up and scales off in concentric rings. The cause of the disease is unknown. It may be cured by scraping away the diseased bark, but trees sometimes recover without treatment.—*C. D. LaRue.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

5136. ANONYMOUS. [Rev. of: NICOLLE, M., et J. MAGRON. *Les maladies parasitaires des plantes (infestation-infection)*. [Parasitic diseases of plants.] 199 p. Masson et Cie: Paris, 1922 (see Bot. Absts. 11, entry 4544).] *Nature* 111: 77. 1923.—This book is prepared chiefly for the medical profession and deals with insect as well as fungus infection. No illustrations are given.—O. A. Stevens.

5137. BERTHELOT, ALBERT, et OSSART. *Sur la pureté des tyrosines commerciales*. [The purity of commercial tyrosins.] *Bull. Soc. Chim. Biol.* 3: 247. 1921.—Examination of 6 samples of commercial tyrosin showed that 2 samples gave a strong biuret reaction and contained large amounts of cystine; a 3rd contained sufficient Ba to completely prevent the development of *Bacillus aminophilus*; and a 4th was merely the crude residue remaining from the manufacture of pancreatic peptone, containing only 20 per cent tyrosin. Only 2 were pure tyrosin (99.7 per cent). The authors emphasize the necessity for chemical and biological examination of commercial tyrosins which are to be employed in bacteriological work.—Joseph S. Caldwell.

5138. BRITTON, W. E., and G. P. CLINTON. *Spray calendar*. Connecticut [New Haven] Agric. Exp. Sta. Bull. 244. 183-226. 1923.—Formulae for 14 insecticidal and 12 fungicidal preparations are given.—A catalogue of the common cultivated plants gives a brief description of the insects and fungi that injure the plant together with the methods of combating the injury. Lists of manufacturers and dealers in spraying machines, insecticides and fungicides are given.—Henry Dorsey.

5139. CARBONE, DOMENICO. *Studi sulle reazioni immunitarie delle piante*. 1. *Introduzione*. [Immune reactions in plants. Introduction.] *Boll. Ist. Sieroterap. Milanese* 2: 261-265. 1922.—It is doubtful whether in green plants a condition of immunity is developed following infection; different investigators have obtained contradictory results. It is still more doubtful whether green plants are capable of opposing to the action of microorganisms proteins with immunizing reactions comparable to those of animals. It is possible that actions of this nature may be simulated or masked by non-specific reactions.—Lillian C. Cash.

5140. CARBONE, DOMENICO, e ITALO CORTESE VIGLIANO. *Studi sulle reazioni immunitarie delle piante*. 2. *Sulle presenza nelle piante di sostanze agglutinanti, precipitanti, emolizzanti ed antiemolitiche*. [The presence in plants of agglutinating, precipitating, hemolytic and antihemolytic substances.] *Boll. Ist. Sieroterap. Milanese* 2: 267-274. 1922.—Some plant saps have been studied to determine their ability to agglutinate microorganisms, and the following have given positive results for some microorganisms: *Armillaria mellea*, lemon fruit, onion bulb, root of *Stachys* and of carrot, cabbage leaves, spinach, celery, goat's-beard, and cladodes of *Opuntia*. The lemon fruit, cladodes of *Opuntia*, celery leaves, and onion bulbs caused a precipitate in horse serum. *Armillaria mellea* was found to possess a hemolytic action on red blood corpuscles of sheep. Lemon fruit, leaves of endive, spinach, chicory, cladodes of *Opuntia*, roots of *Stachys*, and potato tubers had an antihemolytic action. Lemon fruit, leaves of endive, spinach, chicory, cabbage, egg-plant, cauliflower, potato tubers, and onion bulbs agglutinated the red blood corpuscles of sheep.—The degree of agglutinating action differed in the same plant for different bacterial species. Probably there are agglutinating principles filterable through paper but not through clay filters.—The hemolyzing principle of *Armillaria mellea* and the hemagglutinating and antihemolytic principles of potato are not affected by boiling, the latter is active at 37°C. but not at 13-15°C. The hemagglutinating principle of endive is filterable through a clay filter, the antihemolytic principle is not; both can be filtered through paper.—The above described reactions can all be simulated or masked in some plants; but it is always possible and even easy to select plants and antigens in which the reciprocal action is such that the tests are free from the causes of error, which up to the present have vitiated the results of experiments on the immunizing reactions of plants.—These tests were made upon bulbs and young spring shoots. The authors propose to repeat the work using mature plants.—Lillian C. Cash.

5141. EWING, JAMES. *Neoplastic diseases. A treatise on tumors.* 1054 p., 514 fig. W. B. Saunders: Philadelphia & London, 1922.

5142. KONING, M. DE. *Boschbescherming. De leer der ziekten en beschadigen onzer Nederlandsche bosschen.* [Forest protection. Diseases and injuries in Dutch forests.] xiv + 567 p., 385 fig. (5 unnumbered). W. H. Thieme & Cie: Zutphen, 1922.—After a discussion of the question: "What is forest protection?," the author gives a review of the history of plant pathology, laws relative to plant pathology, etc., in the Netherlands, with special reference to forest protection.—The book may be divided into 4 principal parts, treating the followingsubjects: (1) troubles caused by weather conditions, as cold, heat, precipitation, wind, storm, and lightning, each of which is treated and illustrated in detail; (2) troubles caused by environment, e.g., conditions of soil, air, and light; (3) troubles caused by plants, e. g., weeds, algae, and fungi. The latter are treated in considerable detail. In each case the common and scientific names of the fungus are given, followed by a clear semipopular description, with a discussion of control; (4) troubles caused by animals, the latter being divided according to the usual classification. Each animal and the damage it causes are described; likewise, means of control and prevention. The insects are treated extensively. The last 2 chapters discuss the injuries caused by man and by unknown causes.—An index concludes the book.—*Peter J. Klaphaak.*

5143. SCHMIDT, E. W. *Ueber die Voraussetzungen zu einer erfolgreichen Bekämpfung von Pflanzenkrankheiten.* [The requirements for a successful control of plant diseases.] *Zeitschr. Pflanzenkrankh.* 32:293-303. 1922.—The author concludes his discussion of prophylaxis and therapy of disease with the following essential points: (1) the use of really suitable chemical substances, and, if possible, specifics against the respective diseases; (2) intensive treatment with sufficient quantities of the efficient composition of the specific used; (3) use at the most opportune period, i. e., (a) under suitable weather conditions (b) (as far as this refers to the respective causal agents) at the correct biological moment.—*H. J. Güssow.*

5144. WELLS, B. W. *Fundamental classification of galls.* *Science* 57: 469-470. 1923.—The author objects to Cook's statements [see *Bot. Absts.* 12, Entry 3452] as to the classification of galls made by Küster. The latter did not classify galls on the basis of the presence or absence of cell differentiation.—*C. J. Lyon.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 4768, 4771, 4802, 5190)

5145. BALLARD, C. W. *Histology of Cocillana and substitute barks.* *Jour. Amer. Pharm. Assoc.* 11: 781-787. Fig. 1-4. 1922.—Macroscopical and microscopical descriptions are given of 4 samples of Cocillana: (1) the genuine Cocillana, *Guarea Rusbyi*; (2) substitute Cocillana, *G. Bangii*; (3) substitute Cocillana, *Guarea* sp.; (4) substitute Cocillana, *Nectandra* sp. The descriptions are supplemented with drawings of their respective transverse sections and powdered samples. *Guarea Bangii* resembles true Cocillana more closely than the other 2 substitutes, but differs from it sufficiently to render its identification simple. The other 2 substitutes differ greatly from the genuine Cocillana in appearance and physical characters.—*Anton Hogstad, Jr.*

5146. BLACK, O. F., J. W. KELLY, and W. W. STOCKBERGER. *A chemical examination of Venezuelan jaborandi.* *Amer. Jour. Pharm.* 95: 4-7. 1923.—The authors report 0.04 per cent of alkaloid in the leaves of Venezuelan jaborandi which responds to tests for pilocarpine. This plant, which is locally known as "borrachera" on account of the intoxicating effect of

its leaves upon animals, was provisionally named by Ernst in 1883 *Pilocarpus heterophyllus* A. Gray, a species discovered about 1857 by Wright in Cuba. The plant grows in dry hot localities in the vicinity of Barquisimeto.—*Anton Hodstad, Jr.*

5147. BOURQUELOT, EM. *Les principes actifs de quelques plantes employées en médecine populaire; leur recherche par la méthode biochimique.* [The active principles of certain plants employed in popular medicine; their study by biochemical methods.] Bull. Soc. Chim. Biol. 3: 71-84. 1921.—In this posthumous paper the author describes his method of detection and isolation from plant material used in popular medicine of glucosides hydrolyzable by emulsin and summarizes previously published results of its use. *Sambucus nigra* is employed in popular medicine, the bark as a diuretic and purgative and the infusion of the flowers in the treatment of angina and pulmonary catarrh. All parts contain a cyanogenetic glucoside, sambunigrin, hydrolyzed by emulsin to glucose, benzaldehyde, and hydrocyanic acid. Leaves and bark contain large amounts of potassium nitrate, which explains their diuretic properties. Leaves of *Prunus Laurocerasus* contain prulaurasin, an isomer of sambunigrin. Bark and shoots of *P. padus* contain a second isomer, glucoprunasin or amygdonitrile-glucoside. *Plantago major*, *P. media*, and *P. lanceolata* were recommended by Galen as a cure for dysentery and the crushed leaves are popularly used as poultices for bee and wasp stings. The leaves contain aucubin, as do the seed of *Aucuba japonica*, which is hydrolyzed by emulsin to glucose and aucubigenine and which is without physiological effect. The leaves of *Tarus baccata*, reported to be poisonous, contain taxicatin, hydrolyzed by emulsin to glucose and a phenol. Its physiological effects have not been investigated. *Verbena officinalis*, formerly regarded as an universal panacea and still employed as a cataplasm for contusions and in pleurisy, contains verbenalin, hydrolyzed by emulsin to glucose and a phenol which oxidizes to a yellowish brown color. It is without physiological effect. *Olea europaea* contains in stems, leaves, and fruit an amorphous bitter glucoside, oleuropein, which progressively decreases in amount as the fruits mature and is entirely removed by the treatment given them in preparing them for food. Leaves and young fruits have been used in lieu of quinine as an astringent tonic and in intermittent fevers. *Erythraea Centaurium* has a place in almost all European pharmacopoeias, the flowering shoots having long been employed as a tonic and febrifuge. The glucoside present is erytaurin; its physiological effects have not been studied. *Menyanthes trifoliata*, popularly used as a tonic, febrifuge, antiscorbutic, emmenagogue, and vermifuge, contains menyanthin, isolated by Kromayer, and meliatin, neither of which has been studied as to physiological effects. *Hepatica triloba* contains hepatrilobin. *Scabiosa succisa*, employed as a sudorific, detergent, depurative, and as a wash in leprosy and skin diseases, contains scabiosin. Other glucosides isolated in the same laboratory from plants which are not used in medicine are jasmiflorin from *Jasminum nudiflorum*, bakankosin from *Strychnos* seed, arbutin from many varieties of pear, and loroglossin from *Loroglossum hircinum* and other indigenous orchids. In Bourquelot's laboratory 281 species have been examined for the presence of glucosides, with positive results in 205; from 56 of these the glucoside has been isolated. Among plants popularly employed in medicine and included in many pharmacopoeias and which are known to contain glucosides not yet isolated and studied are *Vincetoxicum officinale*, *Sambucus Ebulus*, employed in gout and rheumatism. *Lonicera periclymenum*, used in coughs, *Ajuga Chamaepitys*, an aperient and vulnerary, *Teucrium montanum*, used in insect stings, *Anthyllis vulneraria* and *Melilotus officinalis*, employed as resolutive, *Ononis spinosa*, diuretic, *Aquilegia vulgaris*, antiscorbutic, *Helleborus foetidus*, vermifuge, *Ranunculus bulbosus* and *R. repens*, as external caustics, *Asperula odorata*, *Veronica chamaedrys*, and *V. officinalis*, as tonics and vulneraries, and *Scrophularia nodosa*, as a resolute.—*Joseph S. Caldwell.*

5148. BOURQUELOT, EM., et M. BRIDEL. *Sur un nouveau glucoside hydrolysable par l'émulsi-ne; la scabiosine.* [On scabiosine, a new glucoside hydrolyzable by emulsin.] Bull. Soc. Chim. Biol. 2: 119-124. 1920.—*Scabiosa Succisa* (Dipsaceae) is widely employed in popular medicine in France in lung and skin diseases and especially in itch. The root contains a laevorotatory glucoside (named scabiosin) which is hydrolyzed by emulsin or by dilute sulphuric acid to glucose and an unidentified yellowish water-soluble body.—*Joseph S. Caldwell.*

5149. CHEN, K. K. **Phytochemical notes. No. 91. Cassia oils from leaves and twigs.** Jour. Amer. Pharm. Assoc. 12: 294-296. Pl. 1. 1923.—Three bales of leaves and 2 of twigs of *Cinnamomum cassia* Blume, imported from China, were subjected to distillation and cohobation. The 288 pounds of leaves yielded 658.7 gm. (0.52 per cent) of oil with a density of about 1.054 at 22°C. The 174 pounds of twigs yielded 715.5 gm. of oil (0.9 per cent) with a density of about 1.047.—Anton Hogstad, Jr.

5150. COUCH, JAMES F. **The toxic constituent of greasewood (*Sarcobatus vermiculatus*).** Amer. Jour. Pharm. 94: 631-641. 1922.—Chemical examination revealed large amounts of sodium and potassium oxalates, these being responsible for cases of range poisoning. Toxic alkaloids, glucosides, saponins, hydrocyanic acid or its compounds were not found. The material examined was collected near Salina, Utah.—Anton Hogstad, Jr.

5151. DOWZARD, EDWIN. **Note on the toxicity of castor seed.** Jour. Amer. Pharm. Assoc. 12: 116-117. 1923.—In experiments with guinea pigs the author finds the toxicity to be about 0.179 gm. per kgm. of guinea pig. In the same proportions about 12.2 g. of castor seed would prove fatal to a man weighing 150 pounds.—Anton Hogstad, Jr.

5152. GERLACH. **Zur Lupinenentbitterung. [On removing the bitter principle from lupines.]** Mitteil. Deutsch. Landw. Ges. 38: 220. 1923.—This note gives the loss of protein resulting from 2 methods of treating lupine seed to remove the bitter principle. When first treated with cold water the loss of crude protein was 28.2 per cent; when treated with boiling water, 18.2 per cent.—A. J. Pieters.

5153. GORIS, A. **Sur les constituants des essences de primevère. [The constituents of *Primula* essence.]** Bull. Soc. Chim. Biol. 1: 163-170. 1919.—The roots of *Primula officinalis* Jacq. contain 2 glucosides, primeverin and primulaverin, the composition and structural formulae of which have been determined. The essence of *Primula* obtained by distillation of the roots consists of a solid methyl ester of β -methoxyresorcylic acid derived from primeverin and a liquid methyl ester of metamethoxysalicylic acid derived from primulaverin. The glucosides are not split by emulsin, invertin, or yeast extract, but are hydrolyzed by an enzyme contained in the sepals of this and other species of *Primula*, and which may be identical with betulase and gaultherase since it also hydrolyzes the glucosides of *Monotropa*, *Betula*, and *Gaultheria*. Hydrolysis of primeverin and primulaverin by the enzyme yields a new disaccharide, primeverose, made up of 1 molecule each of glucose and xylose.—Joseph S. Caldwell.

5154. HART, FANCHON. **The histology of Vilca bark.** Jour. Amer. Pharm. Assoc. 11: 906-909. Fig. 1-3. 1922.—The author presents a gross and a histological description of the bark of *Piptadenia macrocarpa* from South America with drawings of the cellular elements and contents. The bark contains a large percentage of tannin, calcium oxalate, and resin. It has been used for tanning and for the fermentation of cane juice. Rusby encountered the trees on the central slopes of the eastern Bolivian Andes at an elevation of 3000-5000 feet. The usual height of the tree is 40-80 feet, and the trunk diameter 1-2 feet. It is instantly recognized by its conspicuous warty bark.—Anton Hogstad, Jr.

5155. HUERRE, R. **Action des hydracides sur l'essence de *Juniperus oxycedrus*. Chlorhydrate, bromhydrate, iodhydrate de cadinine. [Action of hydracids on the essence of *Juniperus oxycedrus*. Hydrochloride, hydrobromide and hydriodide of cadinine.]** Bull. Soc. Chim. Biol. 2: 239-246. 1920.—The essence obtained by distillation of the wood with water, when treated with gaseous HCl, HBr, or HI in the usual way, yields hydrochloride, hydrobromide, or hydriodide of l-cadinine identical with those obtained from the officinal oil of cade. The amount of l-cadinine present in the essence is between 21 and 30.6 per cent.—Joseph S. Caldwell.

5156. MASUCCI, PETER, and GEORGE A. SLOTHOWER. **Some physical and chemical properties of Neorobin.** Jour. Amer. Pharm. Assoc. 12: 335-338. 1923.—Neorobin, a derivative of

chrysarobin made by dissolving chrysarobin in glacial acetic acid and subsequently reducing with metallic tin, was found to be 50 per cent more active than chrysarobin, using the reduction of ammoniacal silver nitrate as a criterion of reducing power. Therefore it should be at least 50 per cent more active therapeutically. Neorobin may be differentiated from chrysarobin by dissolving in acetone, the former producing a golden yellow, the latter a dark red solution. Neorobin was found to be neither a tin compound nor a complex acetate.—*Anton Hogstad, Jr.*

5157. MUNESADA, T. Über den Farbstoff der Frucht von *Gardenia florida* L. (Gelbschote). [The pigment in the fruit of *Gardenia florida*.] Ber. Ohara Inst. Landw. Forsch. 2: 219-223. 1922.—From a study of the physical and chemical properties of the substance, the author believes it to be crocin.—*Margaret Buwens.*

5158. RIPERT, JEAN. Sur la variation et le rôle des alcaloides de la belladonna. [On the variation and rôle of belladonna alkaloids.] 152 p., 20 pl. Oberthür: Rennes, 1922.

5159. RUSBY, H. H. Some interesting medicinal plants of Bolivia. Jour. Amer. Pharm. Assoc. 11: 775-781. 1922.—The introduction, dealing with the history of coto and para coto barks, is followed by the author's findings concerning these barks on his recent trip to South America. Several barks were collected; "Coto Piquante" or "Coto Fino" appears to be the genuine coto, which the author has named with some slight admission of doubt *Nectandra coto*, and the spurious one *Ocotea pseudo-coto* [see Bot. Absts. 12, Entry 2215]. The real para coto was not found. O. E. WHITE submits with the article an account of the discovery of these trees.—The 2nd part deals with Cocillana or Guapi bark and its substitutes, the history of which is reviewed. Four specimens are considered: (1) Guapi or Cocillana "A," the original and genuine article, *Guarea Rusbyi*; (2) Guapi or Cocillana "B," the spurious article that has occurred in commerce, *Guarea Bangii*, a new species [see Bot. Absts. 12, Entry 2215]; (3) Guapi or Cocillana "C," also spurious, pertaining to a large tree of the laurel family, probably a species of *Nectandra*; (4) Guapi or Cocillana "D" also spurious, and pertaining to an undetermined species of *Guarea*.—*Anton Hogstad, Jr.*

5160. SCHEPPEGRELL, WILLIAM. Hayfever and asthma. 274. p., 1 colored pl., 107. fig. Les & Febiger: Philadelphia, 1922.—Hayfever is caused by the pollen of certain common anemophilous plants. Among the common hayfever plants of the eastern and southern U. S. A. may be mentioned *Ambrosia elatior*, *A. trifida*, *A. psilostachya*, *Xanthium americanum*, *Salsola pestifer*, various oaks, *Juglans nigra*, *Salix*, the Gramineae, etc. From the Pacific and Rocky Mountain States, the Artemisias (*A. heterophylla*, *A. tridentata*, etc.) give the most severe reactions. Contrary to an old belief *Solidago*, although its pollen gives a positive reaction, is not a cause of hayfever since it is not wind-borne. To establish the responsibility of a plant for hayfever, botanical and biological tests are required. Among the subjects considered are the history and prevalence of hayfever, the forms and chemical composition of pollen, principal hayfever plants in the U. S. A., common plants not responsible for hayfever, anatomy and physiology of the nose, diagnostic tests of hayfever, hayfever seasons, atmospheric conditions, etiology, classification of many hayfever plants into 4 great groups (Ambrosiaceae, Gramineae, Chenopodiaceae, and the Artemisia group), a list of the plants tested for hayfever reactions at the laboratory of the American Hayfever Prevention Association, with results, prevention of hayfever, treatment, immunization, and hayfever resorts.—*H. W. Youngken.*

5161. SCHWARZ, L. J. A brief review of the crude drugs entered at the port of New York during the part year. Jour. Amer. Pharm. Assoc. 12: 200-204. 1923.—This report from the Pharmacognosy Laboratory in the New York Station of the U. S. Bureau of Chemistry reviews the examination of approximately 3,500 shipments of crude drugs. Detention action was recommended on 210 shipments. Contrary to the common belief that the importations were of unusually poor grade, there was an improvement in the quality of crude drugs imported during the past few years. Individual shipments are discussed.—*Anton Hogstad, Jr.*

5162. SEIL, HARVEY A. **Composition of *Nectandra coto* Rusby sp. nov. Preliminary report.** Jour. Amer. Pharm. Assoc. 11: 904-906. 1922.—The sample was collected by Rusby in South America. The cotoin separated and purified melted at 127-128°C. (uncorrected); gave a brown-black coloration with ferric chloride; and, dissolved in glacial acetic acid to which a few drops of concentrated nitric acid are added, gave a blood-red color. Therefore *Nectandra Coto* is a true coto. Two new alkaloids were found, parostemine, a non-phenolic alkaloid, and parosteminine, a phenolic alkaloid, both names being derived from *Parostema*, the sub-genus of *Nectandra* to which coto belongs. Ether extract 24.83 per cent; volatile oil 1.89 per cent; and ash 1.67 per cent.—*Anton Hogstad, Jr.*

5163. STOCKBERGER, W. W. **Status of drug-plant growing in the United States in 1921.** Jour. Amer. Pharm. Assoc. 12: 120-122. 1923.—The year 1921 brought to a close the cultivation of many medicinal plants in America, which had had considerable success during the war years. A sharp decline was met in the case of *Cannabis*, although a small amount (some 25 acres) was under cultivation during this time. Cultivation of sage almost reached the vanishing point because the home-grown material did not fall within the limits for total and acid-insoluble ash. The exported crop of ginseng was valued at \$974,097, representing about 157,351 pounds of both wild and cultivated roots. Twenty-six educational institutions maintained drug gardens, one of them devoting considerable study to poisonous plants, another to the biochemistry of the mints.—*Anton Hogstad, Jr.*

5164. WHERRY, EDGAR T., and GEORGE L. KEENAN. **Occurrence and forms of calcium oxalate crystals in official crude drugs.** Jour. Amer. Pharm. Assoc. 12: 301-318. Fig. 1-2. 1923.—The authors seek to (1) ascertain whether the crystals in every case possess the optical properties of ordinary (monohydrate) calcium oxalate; (2) identify any having different properties and to work out the crystallographic orientation of each type of calcium oxalate crystal represented. The technical crystallographic data have been reviewed by WHERRY, E. T., Jour. Washington [D.C.] Acad. Sci. 12: 196-200. 1922.—Various forms are reported besides monohydrate calcium oxalate, viz., tetragonal calcium oxalate, monohydrate magnesium oxalate, and potassium hydrogen oxalate. In a few drugs, e.g., *agaricus*, *belladonna*, *myristica*, crystals with properties unlike those of any thus far described were observed; the nature of these has not been determined.—The powdered samples were examined by the immersion method, the liquid used consisting of monobromnaphthalene to which a very little monochloronaphthalene was added, the mixture having a refractive index of 1.650.—*Anton Hogstad, Jr.*

5165. WIRTH, ELMER H. **Pharmacognosy, today and tomorrow.** Editorial. Jour. Amer. Pharm. Assoc. 12: 196-197. 1923.—The author emphasizes that the pharmacognostic field is being rapidly invaded by the chemist through microchemistry, which should rightly belong to the pharmacognocist, and sounds the warning that if pharmacognosy is to be preserved more attention will have to be given to the chemistry of drugs.—*Anton Hogstad, Jr.*

5166. YOUNGKEN, H. W. **A review of the literature in pharmaceutical botany and pharmacognosy for 1921-1922. (August 1, 1921-August 1, 1922).** Jour. Amer. Pharm. Assoc. 12: 122-129. 1923.—The literature is divided into 7 sections: morphology, drug cultivation, micro-analytic and microchemic methods, drug adulteration and substitution, plant chemistry, ash determination, and history. References are made to some 200 articles.—*Anton Hogstad, Jr.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*WILLIAM J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 4734, 4735, 4745, 4748, 4765, 4808, 4813, 4814, 4815, 4823, 4827, 4836, 4843, 4857, 4954, 5008, 5026, 5030, 5032, 5033, 5039, 5065, 5076, 5083, 5084, 5086, 5087, 5100, 5122, 5126, 5128, 5137, 5139, 5147, 5148, 5152, 5153, 5155, 5157, 5164, 5258, 5260, 5265, 5267, 5269, 5270)

GENERAL

5167. CZAPEK, FRIEDRICH. *Biochemie der Pflanzen*. [Biochemistry of plants.] 2nd. ed. Vol. 2, *xii* + 541 p. 1920; Vol. 3, *ix* + 852 p. 1921. Gustav Fisher: Jena.—The first volume of the revised edition of this elaborate work was published in 1913, and contained a treatment of the special and general biochemistry of carbohydrates, fats, and fat-like substances, together with an account of the metabolism of these groups of constituents. Subsequent to the close of the war revision proceeded to the completion indicated, in 1920 and 1921. In revising volume 2 of the old edition the immense accumulation of new material necessitated an additional volume. The material in the present edition is distributed as follows: Volume 2 contains the account of proteins and protein metabolism in all groups of plants, this treatment occupying 321 pages. The remainder of the volume is devoted to the mineral constituents of plant organs and products (205 pages). Volume 3 is subdivided into 3 major parts devoted especially to biochemistry of dissimilation. The 1st is devoted to respiration phenomena, the 2nd to nitrogen-containing excrete products and by-products of metabolism, and the 3rd to the metabolism of nitrogen-free cyclic compounds. It will be seen that the topics just mentioned are relatively more completely elaborated than any other aspect of the work, although an immense amount of new material is incorporated under practically every section. The work is distinctively encyclopedic, though unfortunately conditions arising from the war have obviously made it impossible for the author to incorporate the results of a considerable amount of work done especially in England and America.—*B. M. Duggar*.

5168. FITTING, H. *Aufgaben und Ziele einer vergleichenden Physiologie auf geographischer Grundlage*. [Problems and aims of comparative physiology based on geography.] Address on becoming Rector of the University at Bonn on the Rhine, Germany. 42 p. Gustav Fischer: Jena, 1922.—The title of this address does not indicate what is especially emphasized, namely the knowledge on the part of the physiologist of what formerly was called physical geography, and that "typical" plants do not exist, but that, instead, each individual, or at least individual species, represents the resultant of inherited substance acted upon by environment. While the address resembles an essay in ecology, Fitting's physiological training and experience cause him to point out both the limitations of laboratory physiology and the inadequacy of climatology, soil science, and the other components of ecology, except as the painstaking student may determine the constituents of the actual immediate surroundings of the individual plant. Physiological analysis both of the individual plant and of the space which it occupies leads Fitting to discard the theory of bog-xerophytism, and to recognize that current explanatory hypotheses regarding salt plants, lime plants, and other special plants lack the support of experimental investigation. He commends American studies, particularly Cannon's, of the root systems of desert plants. He reports his own and the researches of others on the moisture content of the various layers of desert soils, and on the concentration of cell-sap, and shows that the concentration of the latter is ample to account for the absorption of water by desert plants. He asserts that cell-sap concentration, which is not always due to salt concentration, is invariably more or less proportional to the degree of dryness of the soil.—*George J. Peirce*.

5169. MOLISCH, HANS. *Mikrochemie der Pflanze*. [Microchemistry of plants.] 3rd ed., 438 p., 135 fig. Gustav Fisher: Jena, 1923.—The revised edition of this work is not signalized by any significant departures, but as contrasted with the 1st edition particularly there is a more extensive treatment of pigments of chromatophores, especially chlorophyll. Much of the more recent work on carotinoids is not included. In the group of anthocyanins the new data considered are almost exclusively German. Subsidiary recent work on chromogens is included in a few paragraphs. Otherwise, one notes few changes except in details of technique and in the inclusion of a few additional glucosides and alkaloids.—*B. M. Duggar*.

5170. WEISS, O. *Grundriss der Physiologie. Zweiter Teil. Biophysik*. [Outline of physiology. Part II, biophysics.] 454 p., 170 fig. Georg Thieme: Leipzig, 1919.—The first part of this work, by Carl Oppenheimer, was concerned with biochemistry [see Bot. Absts. 12, Entry 2721]. In the present volume, after a preliminary chapter of very general nature, the following topics are discussed: physiology of the nerves, movement, production of electricity, luminescence, special physiology of movement, physiology of the central nervous system, physiology of the sense organs, and a brief chapter on temperature and heat production in the body. Plant material is not discussed except incidentally.—*Grace E. Howard*.

DIFFUSION, PHYSICO-CHEMICAL PHENOMENA

5171. BIRCHUMSHAW, LOUIS LEIGHTON. The transition from the colloidal to the crystalloidal state. Solutions of potassium oleate. *Jour. Chem. Soc. [London]* 123: 91-97. 3 fig. 1923.—Although potassium oleate forms a colloidal solution in water, in alcohol it gives a non-associated and non-dissociated solution. A study was made of the behavior of potassium oleate in mixtures of alcohol and water, the density, viscosity, and surface tension being measured in a complete series from pure alcohol to pure water. Heretofore it has been assumed that the transition from colloid to crystalloid takes place gradually. "The experimental results suggest that there are 3 stages in the breaking down of the colloidal aggregate."—*F. E. Denny*.

5172. BROOKS, S. C. Conductivity as a measure of vitality and death. *Jour. Gen. Physiol.* 5: 365-381. Fig. 1. 1923.—The conductance of *Laminaria*, *Saccharomyces*, *Bacillus coli* and *B. butyricus*, *Chlorella*, and of red blood cells has been studied by the electrolytic method of the author and that of Osterhout. Both methods show that conductance of living tissue is closely proportionate to, and determined by, that of the surrounding fluid with which it is apparently in equilibrium. A quantity is defined which is independent of the conductivity of the fluid bathing the tissue. This is called the "net conductance."—*O. L. Inman*.

5173. HERBST, HEINRICH. Über die Adsorption durch Kohlenstoff. [On the adsorption by carbon.] *Biochem. Zeitschr.* 115: 204-219. 1921.—The writer draws the conclusion from his work that in order to know the adsorptive value of any carbon one should know 4 characteristics of it, namely, the purity, as the activity increases with increase in purity; the porosity, upon which the rate of adsorption depends; the ultraporosity loss, dependent upon the size of molecules being adsorbed, to which loss the apparent activity is related; and graphitization, by which is meant that when amorphous carbon is heated to 1200°C. it changes to graphite and its adsorbing power is greatly reduced. In explanation it may be said that the writer speaks of the "true" activity of a carbon as the activity shown in the adsorption of gases of small molecules as N₂, H₂, and CO₂; the "apparent" activity as that shown with larger molecules, and the difference between them he calls the ultraporosity loss. This loss increases as the size of the adsorbed molecules increases. By ultraporosity he means the spaces between the molecules of the adsorbent. If large molecules are being adsorbed the surfaces between the ultimate carbon molecules are not being utilized and the adsorbing surface is reduced with a consequent reduction.—*F. G. Gustafson*.

5174. KELLER, RUDOLF. Dielektrizitätskonstanten biochemischer Stoffe. [Dielectric constants of biochemical substances.] *Biochem. Zeitschr.* 115: 134-158. 1921.—The author presents arguments in favor of his view that the behavior of most substances of biochemical importance is determined by their dielectric constants, which in turn determine the sign of their charges against water or other biochemical substances. Ionic reactions among molecules of small dimensions and among aggregates of such molecules may be important, but the author considers that disparity in size precludes ionic reactions between molecules of substances such as proteins among themselves or with typical crystalloids; the theory of H-ion concentrations is particularly attacked as being entirely unfounded and misleading. Isoelectric points are stated to be governed by surface potential differences which follow Coehn's Law. The chemical nature of dyes is supposed to have little effect on their staining reactions, which are determined by dielectrically produced charges.—On the basis of the author's theory, movement of water in tissues should be from "anodic" towards "cathodic" regions: secreting organs, e.g., sweat glands, stomach epithelium, kidney glomeruli, and plant leaves are anodic, the exceptions being pancreas and salivary glands, yielding alkaline fluids; while absorbing organs are cathodic, e.g., intestinal epithelium, convoluted tubules of the kidney, roots. Fats do not behave in the intestine as predicted.—Dielectric constants of 18 substances including carbohydrates, proteins, lipoids, dyes, serum, etc., are given, but are shown not to furnish conclusive evidence as to the reactions of these substances in living matter.—*S. C. Brooks.*

WATER RELATIONS

5175. BOBILIOFF, W. Onderzoekingen over de transpiratie van *Hevea brasiliensis*. [The transpiration of *Hevea brasiliensis*.] *Arch. Rubbercult.* 4: 498-531. 1920.—Many hydathodes which give off water at night are present on the lower side of the leaves of *Hevea*. Light is the chief factor influencing transpiration and there is almost no transpiration at night. Temperature has more effect on transpiration at low temperatures than at higher ones. The effect of humidity on transpiration is slight. In direct sunlight, rapid transpiration takes place even in a very humid atmosphere. Wind is a factor of great importance. When leaves are wet some water may be absorbed by them. Leaves which become dry after having been wet show a pronounced increase in transpiration rate. The stomata open in light and close in darkness. Transpiration is one of the chief factors influencing yield of latex.—*C. D. LaRue.*

5176. BOSE, J. C. The physiology of the ascent of sap. 277 p., 98 fig. Longmans, Green and Co.: London. 1923.—The object of this work is an attempt to formulate upon experimental evidence a comprehensive theory for the ascent of sap. Various present-day theories are given and each one shown to be lacking in some important detail.—Several appliances of great sensitiveness are described for the purpose of making measurements of the change in the rate of the ascent of sap caused by some physiological variation. For example, responsive movements induced by the ascent of sap are recorded by an apparatus in which the indicating leaf is attached by a thread to a magnifying lever made of fine glass fiber. The lever itself is mounted on jewel bearings. Interesting methods are given for the determination of transpiration rates.—These investigations lead the author to conclude that the ascent of sap is due to the pulsatory activity of definite layers of cells in all parts of the body of the plant, the exact positions of which have been located in 3 regions, namely, the absorbing root, the conducting stem, and the excreting leaf.—*Grace E. Howard.*

5177. HARLAN, HARRY V., and MERRETT N. POPE. Water content of barley kernels during growth and maturation. *Jour. Agric. Res.* 23: 333-360. 1923.—A complete daily record of dry weight and percentage of water in individual kernels of barley [*Hordeum*], varieties Jet and Baku, from flowering to maturity is presented in graphs, tables, and frequency tables.—Immediately following flowering, the kernels show almost identical water content for any 1 day and almost identical daily increase in water content for many days. The range is from about 80 per cent to about 42 per cent. When the latter stage is reached no further deposition of starch occurs and the kernels dry very rapidly.—In Jet, a black pigment develops as deposition of starch ceases so that the progress of ripening is evident.—*D. Reddick.*

5178. POOL, RAYMOND J. *Loftfield on stomata*. [Rev. of: LOFTFIELD, J. V. G. *The behavior of stomata*. Carnegie Inst. Washington Publ. 314. 104 p., 16 pl., 54 fig. 1921 (see Bot. Absts. 11, Entry 1903).] *Science* 57: 418-420. 1923.

MINERAL NUTRIENTS AND SALT RELATIONS

5179. BAKKE, A. L., and L. W. ERDMAN. *A comparative study of sand and solution cultures of Marquis wheat*. *Amer. Jour. Bot.* 10: 18-31. 1 fig. 1923.—A comparison is made of the growth of Marquis wheat in sand cultures and in water cultures, when supplied with Solution III of the National Research Council series; and a determination of the best proportion of the salts KNO_3 , $\text{Ca}(\text{H}_2\text{PO}_4)$, and MgSO_4 . Shive's solution IR_5C_2 was used as a control. The total absorption, the growth of roots and tops, and the change in the H-ion concentration of the media after a $3\frac{1}{2}$ -day period of plant growth therein were recorded. The solutions giving the highest yield in sand were found to be quite different in their salt proportions from those giving the highest yield in water culture. The highest yield in both cases was markedly superior to Shive's R_5C_2 solution. The highest amount of absorption and the maximum green and dry weight of tops occurred in water culture, but the greatest root development in sand. In general, those cultures having the greatest transpiration for the entire growth period also showed the greatest dry weight of tops and of roots. The reaction of the medium in which the plants were grown changed from an average acidity of pH 3.75 before growing the cultures to one of pH 5.94 (for water cultures) and of pH 6.66 (for sand cultures), after growing the plants for one $3\frac{1}{2}$ -day period. No correlation could be shown between the total yield of cultures and their corresponding H-ion concentrations.—E. W. Sinnott.

5180. CANALS, E. *De l'action des sulfate de magnésium sur le développement de la racine et de la tige*. [Action of magnesium sulphate on development of stem and root.] *Bull. Soc. Chim. Biol* 2: 138-139. 1920.—Peas, lupines, beans, and corn were germinated in distilled water and transferred to Detmer's solution in which calcium had been replaced by varying amounts of MgSO_4 . As the amount of magnesium was increased, injury to the root appeared but was accompanied by stimulation of stem growth. This stimulation increased until the amount of magnesium present was 2-5 times that at which injury to roots appeared. In the higher concentrations geotropism was reversed and the roots turned upward out of the solution or grew horizontally along its surface. The addition of calcium enabled the roots to endure about twice as much magnesium without discoverable injury and there was a corresponding increase in the concentration at which maximum stimulatory effect upon tops was observed.—Joseph S. Caldwell.

5181. DAVIS, A. R., D. R. HOAGLAND, and C. B. LIPMAN. *The feeding power of plants*. *Science* 57: 299-301. 1923.—In answer to the theory set forth by Truog in 1922 [see Bot. Absts. 12, Entry 1424] and in previous publications the authors point out several objections. Truog assumed that specific absorbing powers of root cells cause differences between plants, but he failed to take into account the effect of the differences in extent of root system and in the amount and intensity of CO_2 excretion by the roots. Objections are raised to the application of the law of mass action to the absorption of ions of nutritive substances such as potassium. Many studies have shown that the ions are not precipitated in the cell, leaving a low concentration in the cell sap, as would be required if the law of mass action is to affect the case. Neither can the changes in pH of the cell sap be regarded as any controlling influence, since most studies show the pH to vary only within a very narrow range.—C. J. Lyon.

5182. IRWIN, MARIAN. *The behavior of chlorides in the cell sap of Nitella*. *Jour. Gen. Physiol.* 5: 427-428. 1923.—A method is described for determining the chloride content in less than a drop of the cell sap of *Nitella*. The sap shows a concentration of chloride of 0.128 M and the accumulation can be followed during the growth of the cell. The chloride concentration in the cell sap does not increase when the cell is placed for 2 days in solutions (at pH 6.2) containing chloride up to 0.128 M. The exosmosis of chloride from injured cells can be followed quantitatively.—O. L. Inman.

5183. LICHTIN, AARON. **The iron content of lettuce.** Amer. Jour. Pharm. 95: 154-159. Pl. 1. 1923.—The per cent of iron in 5 samples of lettuce is reported as follows: Big Boston, 0.00272; Iceberg, 0.00189; Cos or Romaine, 0.00033; Grand Rapids, 0.00301; May King, 0.00326; the average being 0.00213 per cent. With a salad portion of about 25 gm., one consumes about 0.5 mgm. of iron.—Anton Hogstad, Jr.

5184. McHARGUE, J. S. **Iron and manganese content of certain species of seeds.** Jour. Agric. Res. 23: 395-399. 1923.—The average percentage of iron and manganese found in seeds, each average representing samples of several varieties, is as follows: wheat, iron 0.0039, manganese, 0.0047; oats, Fe 0.0050, Mn 0.0049; garden pea, Fe 0.0096, Mn 0.0012; garden bean, Fe 0.0103, Mn 0.0018; soy-beans, Fe 0.0074, Mn 0.0028; clovers, Fe 0.0156, Mn 0.0039; grasses, Fe 0.0107, Mn 0.0111.—D. Reddick.

PHOTOSYNTHESIS

5185. BALY, EDWARD CHARLES CYRIL, ISIDOR MORRIS HEILBRON, and HAROLD JACOB STERN. **Photocatalysis. Part III. The photosynthesis of naturally occurring nitrogen compounds from carbon dioxide and ammonia.** Jour. Chem. Soc. [London] 123: 185-197. Fig. 1-6. 1923.—Aqueous solutions of ammonia saturated with carbon dioxide were exposed to light from a quartz-mercury lamp. After short exposure-periods methylamine and nitric acid in the form of nitrate were found. The results were checked by comparison with the reagents protected from light. This photosynthesis was represented as having taken place "in 2 stages; 1st, the photosynthesis of formaldehyde by the action of light on the carbonic acid, $\text{H}_2\text{CO}_3 = \text{HCOH} + \text{O}_2$ and 2nd, the interaction of the activated formaldehyde and ammonia, $\text{NH}_2 + \text{HCOH} = \text{CH}_3\text{NH}_2 + \text{O}$." The oxygen set free in these 2 reactions oxidized some of the ammonia to nitric acid. After longer periods of exposure pyridine and piperidine were found. These reactions took place under the influence of ultra-violet light and were prevented by the interposition of a plate-glass screen; but they were found to proceed photocatalytically under the influence of visible light when ammoniacal solutions of cupric carbonate saturated with carbon dioxide were used. When stronger solutions of ammonia and formaldehyde were exposed to ultra-violet light for periods of 6-10 days, positive tests for the alkaloid coniine were obtained. Emphasis is laid on the total absence of alpha-amino acids and of all reducing sugars among the products of these reactions; but high excess of formaldehyde resulted in the formation of reducing sugars.—F. E. Denny.

5186. BAUDISCH, OSKAR. **On the formation of organic compounds from inorganic by the influence of light.** Science 57: 451-456. 1923.—This work was begun with the observation of the reduction of nitrates to nitrites, which takes place in leaves only in the light. Iron is necessary in the leaves and seems to act as a catalyst. Laboratory experiments proved that iron could so act to reduce nitrites to ammonia in the presence of grape sugar but did not attack nitrates. Ferrous salts were found to reduce nitrates in the presence of oxygen and in direct ratio to the amount of oxygen present. An iron peroxide with magnetic properties is supposed to be formed. While such reductions are taking place, there is formed potassium nitrosyl, $\text{K}(\text{NO})$, which reacts in the light with formaldehyde to make form-hydroxamic acid and formaldoxime. There are indications that bacteria form these compounds by the energy of iron peroxide and thus make nitrates available for protein building. Baly, who has extended the experiments in this field, goes so far as to say that formhydroxamic acid is the first step in the synthesis of nitrogen compounds in plants. The author refuses to make such a statement and is of the opinion that the secret of protein formation by plants will not be solved for a long time.—C. J. Lyon.

5187. F., H. B. **The Lourenço Marques Meeting of the South African Association.** Nature 111: 162-164. 1923.—This article includes abstracts of several papers. The presidential address to Section C by D. THODAY dealt with "carbon assimilation." Colorations of weed plants were discussed, their pale green color being attributed to the fact that the intensity of the light renders these colors sufficient.—O. A. Stevens.

METABOLISM (GENERAL)

5188. BRIDEL, MARC. Sur la présence simultanée du gentianose et du saccharose dans les espèces du genre *Gentiana*. [Simultaneous presence of gentianose and saccharose in species of the genus *Gentiana*.] Bull. Soc. Chim. Biol. 2: 37-41. 1920.—Bourquelot and Hérissé showed in 1900 that fresh roots of *Gentiana lutea* contain saccharose and the trisaccharide gentianose, and Bridel in 1913 found the same condition in *G. asclepiadea* and *G. punctata*. He now presents the results of a study of *G. cruciata* and *G. purpurea*. Both these species contain saccharose as well as gentianose, both sugars having been prepared in crystalline form. Gentianose preponderates during the period of active growth, but diminishes toward winter with a concurrent increase in saccharose. The author suggests that the seasonal variations in relative amounts of the 2 sugars is due to reversible action of gentiobiase. It is suggested that a similar reversibility of melibiase may be responsible for the presence of raffinose in sugar beet, sugar cane, and *Taxus baccata*.—Joseph S. Caldwell.

5189. BRIDEL, MARC, et R. ARNOLD. Sur l'application aux végétaux du procédé biochimique de recherche du glucose. [The application to plants of the biochemical method of estimating dextrose.] Bull. Soc. Chim. Biol. 3: 297-306. 1921.—Using a tested and refined method for estimating dextrose in mixture with other sugars (first described by Bourquelot and Bridel [see Bot. Absts. 8, Entry 263], which consists in the conversion of 69 per cent of the dextrose present into the readily crystallizable *b*-methylglucoside by the addition of a solution of emulsin in 50 per cent methyl alcohol. After work with the sugars of strawberries and raisins, which demonstrated the applicability of the method to mixtures containing much dextrose and only small amounts of soluble non-sugars, they apply the method to the dry leaves of *Eucalyptus globulus*, which contain little dextrose and large amounts of non-sugars. The method adopted is as follows: the material, dry or fresh, is extracted with boiling alcohol, diluted to predetermined volume with distilled water, and cleared with lead subacetate. After freeing from lead the solution is evaporated under reduced pressure at 50°C. and extracted with boiling acetic ether to remove fatty and resinous matter, alkaloids, and glucosides. The residue is then repeatedly shaken up with boiling 95 per cent alcohol to extract all sugars, the alcoholic extracts are combined, distilled to dryness in presence of calcium carbonate, and the residue dissolved in cold 50 per cent methyl alcohol and filtered. The reducing sugars are determined in an aliquot, and 1 gm. emulsin per 200 cc. is added to the remainder, which last is kept at 20-25°C. with daily shaking. After 10 days a determination of reducing sugars is made, and if any diminution in reducing power has occurred the determination is repeated at intervals until the results become constant. Whether equilibrium has been attained may then be determined by filtering off the emulsin, adding a fresh quantity, and continuing the sugar determinations, by testing the emulsin to determine whether it has lost its activity, or by adding a known amount of dextrose to the solution and ascertaining whether further synthesis occurs. The absolute proof of the presence of dextrose in the original material is the isolation of *b*-methylglucoside in crystalline form from the products of the reaction. This is accomplished by evaporating the solution to dryness and extracting repeatedly with boiling acetic ether, distilling off the ether, dissolving in water, filtering through charcoal, evaporating under reduced pressure, and taking up the residue in equal parts of boiling 95 per cent alcohol and anhydrous acetic ether, from which the methylglucoside crystallizes out on cooling.—Joseph S. Caldwell.

5190. BRIDEL, MARC, et MARIE BRAECKE. Rhinanthine et aucubine. La rhinanthine est de l'aucubine impure. [Rhinanthine and aucubine. Rhinanthine is impure aucubine.] Compt. Rend. Acad. Sci. Paris 175: 640-643. 1922.—It is found that rhinanthine is not a pure chemical compound but is a mixture of aucubine and saccharose in variable proportions. The study is based on seed of *Rhinanthus Crista-Galli*.—C. H. Farr.

5191. BOURQUELOT, EM., et MARC BRIDEL. Application de la méthode biochimique de recherche du glucose à l'étude des produits de l'hydrolyse fermentaire de l'inuline. [Application of the biochemical method for identification of glucose to the study of the products of enzy-

mic hydrolysis of inulin.] Bull. Soc. Chim. Biol 3: 217-225. 1921.—Various workers have reported the presence of saccharose or dextrose in the products of acid hydrolysis of inulin, thus failing to substantiate the earlier work of Bourquelot, who obtained only fructose by hydrolysis of inulin from *Atractylis gummifera* with inulase from *Aspergillus niger*. The authors examined the products of hydrolysis for the presence of dextrose by a method developed by themselves [see Bot. Absts. 6, Entry 2002]. When emulsin is added to mixtures of dextrose and levulose in 70 per cent methyl alcohol and the reaction allowed to proceed to equilibrium, 82.6 per cent of the dextrose is converted into *b*-methylglucoside, irrespective of the relative amounts of dextrose and levulose present. The authors hydrolyzed inulin from *Atractylis* and dahlia with inulase and treated the products of hydrolysis with emulsin in methyl alcohol for 60-80 days. The reducing power of the solution was unaltered and the optical rotation at the end of the treatment was that of pure levulose. That emulsin was not prevented from acting upon any dextrose present by the conditions of the experiments was proved by the fact that 82.6 per cent of added dextrose was converted into methylglucoside. Hence, there is no dextrose in the inulin molecule.—*Joseph S. Caldwell.*

5192. BOURQUELOT, EM., et MARC BRIDEL. **Obtention biochimique de sucre de canne à partir du gentianeose.** [Obtaining saccharose from gentianose.] Bull. Soc. Chim. Biol. 2: 160-165. 1920.—The complete hydrolysis of gentianose by enzymes involves 2 stages, invertin splits it to levulose and gentiobiase, the latter being then hydrolyzed by gentiobiase to 2 molecules of dextrose. Saccharose has never been isolated from the products of hydrolysis, hence it has been supposed that gentiobiase could not split gentianose into saccharose and glucose. The authors show that when the enzymes are allowed to act for prolonged periods and the dextrose found is removed by converting it into methylglucoside, saccharose can be isolated from the products of hydrolysis. It is considered to be formed by the action of gentiobiase upon gentianose, but that this action is very much slower than that upon gentiobiase; and it is retarded by the presence of dextrose. This situation is analogous to that seen in the action of invertin on mixtures of saccharose and gentianose, in which gentianose is very slowly split.—*Joseph S. Caldwell.*

5193. DELAUNEY, P. **La loroglossine, glucoside du Loroglossum hircinum Rich.; sa presence dans diverses espèces d'orchidées indigènes.** [Presence of loroglossin in several indigenous orchids.] Bull. Soc. Chim. Biol. 3: 238-246. 1921.—The author examined *Orchis simia* Lam., *O. bifolia* L., *Cephalanthera grandiflora* Babingt., *Ophrys aranifera* Huds., and *O. apifera* Huds., for the presence of loroglossin, the glucoside isolated by Bourquelot and Bridel from *Loroglossum hircinum* Rich. [see Bot. Absts. 3, Entry 2839]. He found in each of these species a glucoside identical in melting point, optical rotation, yield of dextrose on hydrolysis with acid or emulsin, and other characters with loroglossin.—*Joseph S. Caldwell.*

5194. JONESCO, ST. **Recherches sur le rôle des anthocyanes.** [The rôle of the anthocyanins.] Ann. Sci. Nat. Bot. 4: 301-403. 1922.—A review of the literature is given in which special attention is paid to: (1) distribution of anthocyanins, (2) chemical properties, (3) chemical nature, (4) chemical relations of the anthocyanins with the flavones and flavonols, (5) the origin of anthocyanins, (6) chemical processes in the formation of the anthocyanins, (7) the influence of various internal and external factors on the formation of the anthocyanins, and (8) the rôle of the anthocyanins.—In the 1st part of the work, young plants of buckwheat (*Sarrasin argenté*) and Bordeaux wheat were used; in the 2nd, red leaves of *Ampelopsis hedera-cea* and dahlia flowers. Small, completely etiolated plants were placed in the light, where they very quickly became colored. The amounts of glycosides and flavones in the etiolated plants, also in those exposed to the light, were determined. Finally, determinations of reducing and non-reducing sugars, starch, and cellulose in all the plants experimented with were made.—The amount of glucosides, flavones, and anthocyanins was decreased in the etiolated plants, in proportion to the length of time they were kept in the dark. The reducing and non-reducing sugars and starch were less in the red plants than in the etiolated plants. During the decrease of glucosides, flavones, and anthocyanins a large amount of free phenol compounds were found

to be produced. The same diminution of glucosides, flavones, and anthocyanins in the etiolated dahlia and *Ampelopsis* material was obtained.—The anthocyanins should not be considered as waste products, but as products necessary in the life cycle of the plant.—*Grace E. Howard.*

5195. KENDALL, A. I. **Carbohydrate identification by bacterial procedures. Studies in bacterial metabolism, LXVII.** Jour. Infect. Diseases 32: 362-368. 1923.—The bacteria studied differed in ability to decompose carbohydrates. On this basis it is suggested that a collection of carefully standardized microbes be utilized as reagents to identify water-soluble carbohydrates.—*R. L. Starkey.*

5196. KENDALL, A. I., and S. YOSHIDA. **The estimation of small amounts of carbohydrates by bacterial procedures. Studies in bacterial metabolism, LXVI.** Jour. Infect. Diseases 32: 355-361. 1923.—The selective utilization of carbohydrates by bacteria suggests a procedure for determining the presence and abundance of some carbohydrates when they occur mixed with other compounds. The authors were able to determine amounts of levulose as small as 0.001 per cent in peptone medium by measuring the reaction changes effected by *B. coli*. The more sugar initially present in the medium, the greater was the resulting increase in acidity.—*R. L. Starkey.*

5197. KENDALL, A. I., and S. YOSHIDA. **The measurement of carbohydrate mixtures by bacterial procedures. Studies in bacterial metabolism, LXVIII.** Jour. Infect. Diseases 32: 369-376. 1923.—Cultures of *B. proteus*, *B. mesentericus*, and *B. coli* differed with regard to decomposition of numerous carbohydrates. This characteristic was made use of in determining the presence and amounts of lactose and glucose in prepared solution mixtures of these 2 carbohydrates.—*R. L. Starkey.*

5198. KENDALL, A. I., R. BLY, and R. C. HANER. **Carbohydrate configuration and bacterial utilization. Studies in bacterial metabolism, LXIX.** Jour. Infect. Diseases 32: 377-383. 1923.—A series of sugar derivatives were prepared from *d*-glucose, mannose, and galactose differing merely in the character of the terminal groups. All of numerous organisms studied decomposed glucose. The other carbohydrates and their derivatives were decomposed by organisms and not by others. The common enol formation was not found to be an absolute prerequisite to fermentation. Most staphylococci were unable to ferment any except the aldose-ketose sugars. It was concluded that the influence of the terminal group in hexose sugars and derivatives on microbial utilization had received some support.—*R. L. Starkey.*

5199. LEPESCHKIN, W. **Étude sur les réactions chimiques pendant le gonflement de l'amidon dans l'eau chaude. (Contribution au problème des coefficients de température extrêmement grands.)** [Studies on the chemical reactions during the swelling of starch in hot water. (The problem of high temperature coefficients).] Bull. Soc. Bot. Genève 13: 40-65. 1 pl., 1 fig. 1921.—The formation of starch jelly cannot be considered as a particular case of swelling of starch in water. Only the swelling of starch in cold water is a phenomenon purely physical and completely reversible. The swelling of starch in hot water involves 2 processes: (1) a chemical reaction between the polysaccharides of starch and water leading to the formation of hydrates at the expense of the anhydrides; (2) a swelling in water of the products thus formed. The absorption of water by these hydrate compounds is 10 times greater than that observed for starch in cold water, and the absorption of water by starch operates in the same manner in cold and hot water.—All acids except H_2SO_4 accelerate the chemical reaction between the polysaccharides of starch and water. In all cases the acceleration caused by the presence of acids is not proportional to the quantity of H-ions in the liquid. This result confirms the hypothesis that the reaction of special interest in this connection is not one of hydrolysis but rather a chemical union of water with the polysaccharides of starch.—*W. H. Emig.*

5200. ROUGE, E. **Sur les flavones et leur rôle dans la cellule végétale.** [The rôle of flavones in the plant cell.] Bull. Soc. Bot. Genève 13: 18-19. 1921.—Flavones reduce silver nitrate and give all the reactions indicated by Czapek. After the death of the plant, silver nitrate is not reduced by the chloroplasts or by plasma. The flavones in alkaline solution have a great affinity for oxygen and lose their power to reduce silver nitrate. The flavones are important in the process of assimilation in that they absorb oxygen and transport it away from the cell.—W. H. Emig.

5201. WOLFF, J., et B. GESLIN. **Sur quelques propriétés de l'inuline et ses changements d'état physique.** [On certain properties of inulin and its changes of physical state.] Bull. Soc. Chim. Biol. 2: 19-23. 1920.—*Schizosaccharomyces Pombe* formed no alcohol during 7 days growth in a solution containing pure inulin; in a solution containing inulin and saccharose the alcohol formed in the same time was equal to all the saccharose and 10 per cent of the inulin present. Impure preparations containing inulides are partially fermentable. The solubility of inulin in water at different temperatures varies with the method of preparation, that obtained by maceration of roots of dahlia in water and evaporating to dryness being much less soluble than that obtained from water extracts by precipitation with alcohol; but such alcohol precipitates again show lowered solubility when dissolved in water and evaporated to dryness. The phenomenon is reversible and due to a change of physical state, possibly to a difference in degree of hydration. Treatment with a water extract of *Aspergillus niger* prior to precipitation with alcohol gives a still greater increase in solubility, especially at lower temperatures. Inulin from dahlia, no matter by what method prepared, is very much less soluble than inulin from *Cichorium Intybus*.—Joseph S. Caldwell.

METABOLISM (NITROGEN RELATIONS)

5202. BLANCHETIERE, A. **Action du bacille fluorescent liquéfiant de Flüge sur certains amino-acides en milieu chimiquement défini.** [Action of *Bacillus fluorescens liquefaciens* Flüge upon certain amino-acids in a chemically controlled medium.] Bull. Soc. Chim. Biol. 2: 28-36. 1920.—Alanin, leucin, asparagin, phenylalanin, tyrosin, and histidin, singly or in combination, were added in known quantities as sources of nitrogen and carbon for *Bacillus fluorescens liquefaciens*, the medium being otherwise constant in composition. When used singly, histidin, alanin, and asparagin were most readily attacked. When 2 acids, both of which are readily attacked, are employed in mixture, both are used up more rapidly than either would be if used alone, and the presence of one which is readily attacked appears to aid the organism in attacking another which is not used if present alone. The hypothesis is suggested that the unattackable amino acid is deaminized by some of the intermediate metabolic products derived from the attackable acid. Benzoylalanin permitted no growth when used alone. The introduction of the benzoyl radical therefore interferes with the utilization of the acid, as expected from the accepted ideas of the mechanism of bacterial action upon aminoacids. When employed in mixture with alanin there was slight growth without pigment development, but the benzoylalanin was decomposed to some extent, as was shown by recovery of benzoic acid.—Joseph S. Caldwell.

5203. DAVIDSON, JEHIEL, and J. A. LECLERE. **Effect of various inorganic nitrogen compounds applied at different stages of growth on the yield, composition, and quality of wheat.** Jour. Agric. Res. 23: 55-68. 1923.—Inorganic nitrates applied in the early stages of growth, uniformly resulted in highest yields but applications made at the time of heading reduced the amount of "yellow-berry" and increased the protein content of the kernels and straw.—Contrary to previous experience, no relation was found between nitrogen content and weight per bushel of grain.—Various chemicals, not nitrogen carriers, such as chlorides of sodium, calcium, potassium, etc., produced no effect on yield or on quality of grain. The application of nitrogen at the time of heading or at the milk stage depressed the phosphoric-acid content of grain and of straw and depressed the ash and silica content of straw.—D. Reddick.

5204. FALK, I. S., and M. F. CAULFIELD. Some influences of hydrogen ion concentration upon antigenic properties of proteins. [Abstract.] Absts. Bact. 7: 27. 1923.

5205. HUGOUNENQ, L., et GABRIEL FLORENCE. Recherches sur la synthèse des acides amines aromatiques dans la cellule vivante. Premier mémoire. [The synthesis of aromatic acid amines in the living cell. I.] Bull. Soc. Chim. Biol. 2: 13-18. 1920.—*Aspergillus niger* was grown on various modifications of Raulin's solution and tested for the presence of tyrosin and tryptophane by the methods of Adamkiewicz, Herzfeld, and Hopkins and Cole. Hexoses are not necessary for the formation of tryptophane and tyrosin, since substitution of arabinose and xylose for saccharose did not affect the growth of the fungus or decrease the amounts of tyrosin and tryptophane formed. Normal growth and positive reactions for tyrosin and tryptophane were also obtained when glyecoll, leucin, phenylalanin, tyrosin, or tryptophane were used as sources of nitrogen; no growth was obtained when phenylalanin or the hydrochlorides of lysin or histidin were used. Very poor growth was obtained when 1 gm. per l. of phenylglycin or orthonitrophenylpropionic acid was added to Raulin's liquid. There is therefore a wide range in the raw materials from which the fungus is able to synthesize its proteins; the authors propose to investigate the question whether the cells of higher organisms possess equally great synthetic powers.—Joseph S. Caldwell.

5206. HUGOUNENQ, L., et GABRIEL FLORENCE. Recherches sur la synthèse des acides amines aromatiques dans la cellule vivante. Deuxième mémoire. Étude de l'aspergilline. [The synthesis of aromatic acid amines in the living cell. II. Aspergilline.] Bull. Soc. Chim. Biol. 2: 133-136. 1920.—The authors isolated the black pigment of *Aspergillus niger*, which they name aspergilline, by treating the spores with 10 per cent NaOH, neutralizing with H_2SO_4 to precipitate, washing with water, dissolving in NH_4OH , precipitating with acetic acid, washing, and drying, thus obtaining a non-crystalline powder insoluble in water or acid but soluble in alkalis. It contains Fe, S, Zn, and Ca, and the elementary analysis suggests to the authors a likeness to hematogen of eggs. They regard both substances as greatly condensed substance containing all the mineral elements necessary for the development of the new organism. Distillation by Nencki's method set free ammonia, indol, and a compound having the odor of amylamine, while the residue contained small amounts of fatty acids.—Joseph S. Caldwell.

5207. MESTREZAT, W. et MARTHE PAUL JANET. L'azote titratable par la méthode de Kjeldahl. [Estimation of nitrogen by the Kjeldahl method.] Bull. Soc. Chim. Biol. 3: 105-130. 1921.—This is a comprehensive résumé of the literature, discussing various modifications of the original method. Nitrogenous compounds are grouped into 5 classes with respect to the ease with which the nitrogen may be measured by the Kjeldahl method. (1) Very readily determined: aliphatic amines, certain aromatic amines, imines, amides, urcides, the pyrrol nucleus, the pyrimidine nucleus, purine and its derivatives. (2) Possible but difficult to determine, requiring prolonged heating, etc.: guanidine derivatives, indol and skatol nuclei, acridine, the quinoline nucleus, the piperazine nucleus, morphine, brucine. (3) Difficult and giving only doubtful results: certain aromatic amines, quaternary ammonium compounds, azo-, azoxy-, and diazo-derivatives (doubtfully), the tropic nucleus, tyrosin. (4) Direct measurement impossible, but may be made after reduction: nitrates, nitrites, nitro and nitroso derivatives, nitriles, cyanogen derivatives, hydrazines, hydrazones, osazones, azo-, azoxy-, and diazo derivatives. (5) Compounds the nitrogen of which is lost in wet-way determinations: Pyridin and pyrazol and their derivatives. A bibliography of 50 selected titles is appended.—[See also following abstract.].—Joseph S. Caldwell.

5208. MESTREZAT, W., et MARTHE PAUL JANET. Présence dans l'urine d'une reste azoté que ne dose pas la méthode de Kjeldahl. Étude comparée des résultats fournis dans quelques cas par la technique de Kjeldahl-Foerster et la méthode de Dumas. [Presence in urine of a nitrogenous residue not determined by the Kjeldahl method. Comparative results obtained by the Kjeldahl-Foerster and the Dumas methods.] Bull. Soc. Chim. Biol. 3: 88-94. 1921.—The yields by the Dumas method were in all cases 1-9 per cent higher than those by the

Kjeldahl-Forster method. The reasons for the discrepancy are discussed in detail in another paper [see preceding abstract].—*Joseph S. Caldwell.*

5209. THOMAS, P. **Le dosage colorométrique de la tyrosine et l'indice phénolique de protéiques.** [Colorimetric estimation of tyrosin and the phenolic index of proteins.] *Bull. Soc. Chim. Biol.* 3: 197-216. 1921.—The author's earlier work on colorimetric methods of estimating tryptophane [see following abstract] led him to examine the colorimetric methods of estimating tyrosin proposed by Folin and Denis, Denigès, and Morner, and by the use of Milton's reagent. He finds that the results obtained by the Folin and Denis method are affected by the time allowed for the reaction, the presence of tryptophane, various reducing substances, indol and its derivatives, and dioxyphenylalanin, with the result that he pronounces it wholly untrustworthy. The Denigès-Morner reaction is not sufficiently delicate and the color obtained in a mixture of products of protein hydrolysis is difficult to measure colorimetrically, hence work with it was abandoned. The author then endeavored to employ Millon's reagent in such manner as to make the reaction a quantitative test for tyrosin, finding that tryptophane, oxytryptophane, and dioxyphenylalanin gave interfering colorations. Tryptophane may be removed from the products of protein hydrolysis by precipitation with a mercury salt, but such treatment would not remove oxytryptophane or dioxyphenylalanin if present. Nillon's reagent can therefore be employed as a colorimetric method for determining the total content of phenol compounds, or "phenolic index," of a protein, in terms of tyrosin. A standard method of employing it is described and results of a number of determinations upon 9 proteins are given in the form of a table, in which the content of tyrosin as determined by Folin and Denis and by the author using their method is compared with the author's phenolic index and with the tyrosin content found by workers who have made quantitative analyses. Thomas invariably obtains considerably higher results by the use of the Folin-Denis method than do these authors themselves. The phenolic index determinations run roughly parallel but are much lower in such proteins as are rich in tryptophane, and all are very much higher than the amounts obtained by quantitative analyses.—*Joseph S. Caldwell.*

5210. THOMAS, P. **Sur le dosage de l'ammoniaque dans les cultures en présence d'urée.** [The determination of ammonia in cultures in the presence of urea.] *Bull. Soc. Chim. Biol.* 7: 171-175. 1919.—A method for determining small quantities of ammonia in the presence of large amounts of the various nitrogenous products present in a yeast culture is described. Phosphoric acid is eliminated from the solution by adding hydrochloric acid and neutral lead acetate until no further precipitation occurs, after which powdered lead carbonate is added and the solution allowed to stand 15-18 hours. The liquid is then filtered and the filter washed with cold water. Magnesia is added and the distillation is conducted under reduced pressure in a modified Schloesing-Aubin apparatus at 35-40°C. Air enters through a trapflask containing H_2SO_4 and the NH_3 is drawn through a condenser and received into H_2SO_4 and determined by titration. The author claims advantages over the similar method of Nencki and Zaleski in that the apparatus employed is simpler and everywhere obtainable.—*Joseph S. Caldwell.*

METABOLISM (ENZYMES, FERMENTATION)

5211. AMBARD, L. **Fixation de l'amylase par l'amidon cru et l'empois d'amidon.** [Fixation of amylase by raw starch and starch paste.] *Compt. Rend. Soc. Biol.* 83: 1458-1460. 1920.—It has been established by Sorensen, Michaelis and Rona, and others that amylolytic action of amylase is greatest when the medium has a pH of 6.6. It is easy to obtain this reaction with extracts high in amylase content, as saliva or pancreatic juice, but it is difficult to adjust the reaction with such materials as urine or blood, which are low in amylase. The authors find that it is possible to adsorb quantitatively the amylase present in such dilute solutions upon raw commercial rice starch and to remove foreign substances by washing without loss of the enzyme. When added to a starch paste adjusted to pH 6.65, the enzyme is quantitatively transferred to combination with the paste, as is shown by the fact that the enzymic activity is 96-98 per cent of that of check solutions.—Adsorption of amylase by raw starch is apparently specific; it has no power to adsorb invertase. Some experiments with invertase adsorbed upon

animal charcoal show that, contrary to expectation, the charcoal retains invertase quantitatively when washed with 0.1 per cent sugar solution but gives it up almost wholly when the wash water contains no sugar. The phenomenon is much more complex than has heretofore been realized, as the presence of small quantities of sugar is necessary for the fixation of invertase upon carbon.—*Joseph S. Caldwell.*

5212. AMBARD, L. **Fixation de l'amylase sur l'amidon cru et l'empois d'amidon.** [Fixation of amylase by raw starch and starch paste.] *Compt. Rend. Soc. Biol.* 84: 230-232. 1921.—Continuing an earlier note of the same title [see preceding abstract] the author reports further studies of the conditions for the adsorption or fixation of amylase upon raw starch. He substitutes glycogen for starch paste in digestion experiments for the reason that the latter is partially precipitated from saline solution by centrifuging, hence is difficult to separate from the raw starch. Fixation of the enzyme upon raw starch is as complete in an electrolyte-free medium as in saline solution, but when amylase adsorbed upon raw starch is added to a solution of salt-free glycogen not more than 4 per cent of the amylase is set free. If NaCl be added the amylase is quantitatively released. These facts indicate that amylase is a colloid and that it follows the general laws of colloids in forming adsorption compounds, as is also suggested by the readiness with which it is precipitated from solution under certain conditions. The proportions of amylase released from the enzyme-starch complex by identical quantities of glycogen are 98, 90, and 74 per cent when the concentrations of glycogen are 1, 0.1, and 0.01 per cent respectively, hence follow the general laws of adsorption. This fact may furnish an explanation of the observation that when the initial concentration of starch is 1 per cent or more the amount of hydrolysis per unit of time is constant, while it rapidly decreases if the initial concentration is less than 0.1 per cent. If the formation of a combination between enzyme and substrate is a preliminary step in the reaction, the proportion of combined and active enzyme must fall off as the initial concentration of the substance is decreased.—*Joseph S. Caldwell.*

5213. AMBARD, L. **Sur l'amylase. Son dosage. Mechanisme de la digestion amylolytique.** [Amylase, its estimation; mechanism of digestion by amylase.] *Bull. Soc. Chim. Biol.* 3: 51-65. 1921.—Continuing previous studies [see 2 preceding abstracts] the author gives details of the technique for absorbing amylase upon raw starch, shows that the absorption is specific and quantitative, and that reducing substances are not taken up on the starch. The paper is principally concerned with the conditions for release or "defixation" of the enzyme from combination with starch. Preparations repeatedly washed with 2 per cent solutions of levulose, saccharose, glycerol, maltose, inulin, gum arabic, or mastic in 0.3 per cent saline solution showed no defixation, but preparations washed with ferric hydroxide and aluminum hydroxide showed reduction to 63.5 and 70.4 per cent respectively of normal activity. The author assumes that Fe and Al enter into combination with the enzyme-starch complex, thus "immobilizing" the enzyme. Glycogen is to be preferred to starch paste for defixation because of its greater stability; the presence of a neutral salt, such as NaCl, is absolutely necessary for defixation. The reaction of the medium is important and should be pH 6.6. At pH 5.0 and 8.04 the activity of the enzyme is only 60 per cent of the normal, although the destruction of the enzyme at these points is only about 2.5 per cent. The author finds no evidence that the fixation of amylose upon glycogen is retarded by the accumulation of maltose, since the presence of maltose in the solution with glycogen does not affect the defixation of amylose from raw starch. The rate of hydrolysis is determined by the number of enzyme substrate groups in combination, by the temperature and reaction of the medium, and by the accumulation of products of the reaction.—*Joseph S. Caldwell.*

5214. AMBARD, L., E. PELBOIS, et M. BRICKA. **Similitude de l'hydrolyse du sucre par les acides et de l'hydrolyse de l'amidon par l'amylase.**—Etude de certaines réactions monomoléculaires. [Similarity of the hydrolysis of saccharose by acids and the hydrolysis of starch by amylase; a study of the mechanism of certain monomolecular reactions.] *Bull. Soc. Chim. Biol.* 2: 42-63. 1 fig. 1920.—The authors advance the thesis that the rôle played by neutral salts in the hydrolysis of starch by amylase is qualitatively and quantitatively identical with

that which they play in the hydrolysis of saccharose by acids, and that the so-called "activation" of the enzyme by salts is in reality an effect exerted upon the substrate. The argument rests upon experimental data showing that the amount of sugar produced per unit of time when starch paste containing known amounts of NaCl is acted upon by salivary amylase which has been dialyzed until free of salts, is directly proportional to the amount of amylase employed, but is not materially affected by a considerable variation in the amount of NaCl present. The mechanism of the action of neutral salts upon the substrate is not explained, and the widely accepted hypothesis that they accelerate enzymic activity through increasing the colloidal dispersion of the enzyme is not mentioned.—*Joseph S. Caldwell.*

5215. BRIDEL, M., et R. ARNOLD. Sur l'emploi de divers agents de précipitation dans la préparation de l'émulsion des amandes. [The use of various precipitating agents in preparing emulsin from almonds.] Bull. Soc. Chim. Biol. 2: 216-222. 1920.—Three preparations made from sweet almonds are compared as regards enzymic activity. Preparations were made (1) by precipitating an aqueous extract with 2 volumes 95 per cent ethyl alcohol, which was allowed to act 48 hours; (2) by using 2 volumes methyl alcohol, allowed to act 31 hours; (3) by using 2 volumes of acetone, allowed to act 28 hours. When washed with ether and dried, the comparative yields for the 3 were as 16:15:21. The 3 preparations were tested as to both hydrolytic and synthetic activity of *b*-glucosidase, *b*-galactosidase, lactase, gentiobiase, cellobiase, and invertin. The hydrolytic activity of *b*-glucosidase, tested on amygdalin, salicin, *b*-benzylglucoside, and *b*-methylglucoside, was identical for the 3 preparations, as was the synthesis of *b*-methylglucoside from glucose in methyl alcohol. Activity of the galactosidase was tested upon *b*-ethylgalactoside, and was greatest in the ethyl alcohol preparation, least in the acetone preparation; the 3 preparations held the same order as regards synthetic activity. There were only insignificant differences in the activity of lactase, gentiobiase, and cellobiase in the 3 preparations, but the invertin of the methyl alcohol preparation was most rapid in action. Emulsin may be prepared in any of these ways but prolonged contact with the precipitating agent should be avoided.—*Joseph S. Caldwell.*

5216. COLIN, H. Action de la sucrase sur les satellites de l'inuline. [Action of sucrase on the sugars accompanying inuline.] Bull. Soc. Chim. Biol. 2: 157-159. 1920.—The expressed sap of common varieties of *Helianthus tuberosus* becomes strongly dextrorotatory during winter despite the presence of various laevorotatory polyoses which accompany inulin. Hydrolysis of saccharose alone could not account for the change. Addition of sucrase to the expressed sap brings about hydrolysis occurring in 2 stages, in which the changes in optical rotation and in reducing power do not run parallel, indicating that more than 1 sugar is being acted upon. Pseudo-inulin, inulinin and helianthenin, which accompany inulin, are readily prepared by reason of their differing solubility in alcohol. In the pure state they are not attacked by sucrase. Synanthrin, which is difficult to separate from saccharose, is hydrolyzed concurrently with saccharose; whether this is due to the action of sucrase or to that of a specific synanthrin-splitting enzyme which is associated with sucrase is to be further investigated.—*Joseph S. Caldwell.*

5217. COLIN, H. Quelques corollaires des lois de l'hydrolyse diastatique. [Certain corollaries of the laws of enzymic hydrolysis.] Bull. Soc. Chim. Biol. 3: 263-272. 1921.—When a quantity of saccharose is acted upon by invertin under constant conditions, the amount of inversion per unit of time is a constant until a point is reached at which the alteration in ratio of concentration between sugar and enzyme begins to affect the rate. Whether the curve is a true logarithmic one depends upon the initial ratio between enzyme and substrate. The mathematical laws applying to the process hold for all enzymic hydrolyses in which a single reaction occurs under definite conditions, but not for such complex reactions as the conversion of starch by diastase. The author shows how the laws of hydrolysis may be applied to the determination of the degree of purity of various sugars, as raffinose, synanthrin, and gentianose, to the measurement of the quantity of enzyme, and to the determination of molecular weights of sugars.—*Joseph S. Caldwell.*

5218. EMOTO, YOSHIKADZU. Ueber die Enzyme einiger Saprolegnien. [Enzymes of some Saprolegnias.] Bot. Mag. Tokyo 37: (13)-(29). Pl. 1. 1923. (In Japanese.)—In *Saprolegnia Tokugawana* n. sp., which is described in detail, positive reactions were obtained for the following intra-cellular enzymes: amylase, inulinase, pectinase, cellulase, raffinase, invertase, lactase, maltase, emulsin, salicase, and proteolytic enzymes (acid, neutral, alkaline). Glycolase (Glykolyse), lipase, urease, tyrosinase, oxydase, peroxydase, and catalase were not found. In a species of *Achlya* lacking oogonia the results were identical except that glycolase (Glykolyse) was present.—Of intra-cellular enzymes in the *Saprolegnia*, amylase, inulinase, raffinase, invertase, lactase, maltase, emulsin, salicase, glycolase (Glykolyse), proteolytic enzymes (acid, neutral, alkaline), peroxydase, and catalase were present and pectinase, cellulase, lipase, urease, tyrosinase, and oxydase absent. In the *Achlya*, amylase, inulinase, cellulase, invertase, lactase, maltase, emulsin, salicase, proteolytic enzymes (acid, neutral, alkaline), peroxydase, and catalase were present and pectinase, glycolase (Glykolyse), lipase, urease, tyrosinase, and oxydase absent.—From Author's German abstract.

5219. HARVEY, ELLERY H. Efficiency of some common anti-ferments. Amer. Jour. Pharm. 94: 797-801. 1922; 95: 105-108. 1923.—The author records the effect of some 18 anti-ferments, including mercuric chloride, potassium cyanide, sodium hypochlorite, ultra-violet rays, sodium arsenate, hydrogen peroxide, methyl salicylate, furfural, formaldehyde, copper sulphate, etc., on invertase of yeast in sucrose solutions. The method for measuring the retarding action is given. The author suggests that the ultra-violet radiation, used as a bactericide, might further be employed as an anti-ferment, since no toxic residue is left in the treated material. In most cases the action of the anti-ferment was one of gradual retardation rather than an immediate cessation of activity. Many commonly used materials were noted to have a low percentage of activity.—Part II. The action of an additional list of anti-ferments on yeast is reported, which includes several volatile oils from spices, nitro-benzol, oxalic acid, saccharin, sodium fluoride, etc. The use of volatile oils, within the limits set by the taste, is an aid in the preservation of such food products as catsup, tomato sauce, etc. Saccharin exerts but a mild anti-ferment action. The yeast activity was found to be but slightly inhibited by dilute salt solutions. Dilute mineral acid hydrolysis of sucrose solutions produced a curve having the characteristics of enzyme-inverted sugar solutions.—Anton Hogstad, Jr.

5220. JOFFE, JACOB S. Homogeneous catalysts in the oxidation of sulfur by *Thiobacillus thiooxidans*. [Abstract.] Absts. Bact. 7: 8. 1923.—The activities of the organism, resulting in the production of sulphuric acid as high as 2 N, are increased by the presence of several catalysts, particularly by nickel, uranium, caesium, and zinc. The presence of 10 ppm. of salts of these metals in the medium with an excess of sulphur resulted in an increase of from 20 to 40 per cent oxidation of sulphur in 30 days.—D. Reddick.

5221. MELDOLESI, GINO. Die Wirkung von Druck auf die Geschwindigkeit der Fermenthydrolysen durch Pepsin, Trypsin und Diastase. [The effect of pressure on the rate of hydrolysis by pepsin, trypsin, and diastase.] Biochem. Zeitschr. 115: 85-95. 1921.—The writer finds that the action of pepsin and trypsin upon blood albumin is influenced by pressure. The pressure over 1 atmosphere was produced by CO₂ or N₂. The reaction was most rapid at a pressure of 5 atmospheres, less at 10 atmospheres, but more than at 1 atmosphere pressure. The difference in rate was most noticeable during the first 2 hours of the experiments. The hydrolysis of arrow-root starch by diastase was also studied; pressure influenced the reaction in the same way as it affected the reaction of pepsin and trypsin. The reactions are illustrated by graphs.—F. G. Gustafson.

5222. MICHAELIS, L. Weitere Beiträge zur Theorie der Invertasewirkung. [Further contribution to the theory of invertase action.] Biochem. Zeitschr. 115: 269-281. 1921.—In colloidal solutions the reaction is usually proportional to the surface and not to the concentration of the dissolved substance. This is not the case with invertase, for here the active

mass of the enzyme, whether free or adsorbed on ferric hydroxide or carbon, is always proportional to the concentration. This fact entitles one to apply the mass law to the inversion of cane sugar. The effectiveness of the invertase adsorbed by the ferric hydroxide does not depend upon the ability of the cane sugar to dissolve it from the hydroxide, because the adsorbed invertase hydrolyses the sugar before it is dissolved from the hydroxide. Other disaccharides are able to dissolve the invertase from the ferric hydroxide without themselves being acted upon by the enzyme.—*F. G. Gustafson.*

5223. NEUBERG, CARL, und JULIUS HIRSCH. Über ein Kohlenstoffketten knüpfendes Ferment (Carboligase). [Carboligase, a carbon chain-synthesizing enzyme.] *Biochem. Zeitschr.* 115: 282–310. 1921.—The experimental work is divided into 3 parts. In the 1st the reaction between cane sugar and benzaldehyde in the presence of yeast is discussed. The 2nd part deals with the reactions characteristic of the substance formed from sugar and benzaldehyde. The empirical formula is given as $C_6H_{10}O_2$ with the probable structural formula $C_6H_5 \cdot CO \cdot CHOH \cdot CH_3$. The 3rd part deals with the enzyme nature of the substance found in yeast which brings about the reaction between benzaldehyde and acetaldehyde, derived freshly from the destruction of sugar. Carboligase, as the enzyme is called, facilitates the construction of carbohydrates, while carboxylase aids in their destruction.—*F. G. Gustafson.*

5224. RUEHLE, G. L. A. The enzymic content of bacterial spores. [Abstract.] *Absts. Bact.* 7: 7. 1923.

5225. SOPPELAND, LULU C., and MAX LEVINE. On some factors influencing proteolysis in dairy wastes. [Abstract.] *Absts. Bact.* 7: 19. 1923.—An adequate supply of air and a neutral or slightly alkaline reaction are favorable for proteolysis.—*D. Reddick.*

METABOLISM (RESPIRATION, AERATION)

5226. MAQUENNE, L., et E. DEMOUSSY. Observations sur la résistance des végétaux à l'asphyxie. [Observations on the resistance of plants to asphyxiation.] *Bull. Soc. Chim. Biol.* 3: 273–278. 1921.—Failure of germination in seeds submerged in water is shown to be due to the low O_2 content of the water; when provision was made for aerating water constantly circulated through a tube containing the seeds, normal germination and development of the young plants occurred. Older plants when completely immersed die very quickly because of the slow diffusion of air through water.—The darkening of many leaves on dying is due to oxidation, and does not occur in the absence of air. In the leaves of *Aucuba* darkening on dying occurs even in vacuo and is due to the splitting of the glucoside aucubin by emulsin. It therefore serves as a check upon the condition of the cells. Floated on water, the leaves remain green for 2 months, when submerged 4–5 mm. in water they brown in 3–4 days by reason of lack of O_2 . In leaves which discolor as a result of oxidation no change of color occurs while submerged, but they very rapidly become brown when again brought into the air. When leaves of this type are spread flat against a surface beneath water which is aerated, those which have the lower surface toward the water discolor very quickly, those with the upper surface very much more slowly, showing that O_2 enters at a rate directly proportional to the number of stomata. In strong sunshine submerged leaves live for very long periods, since the light decomposes the CO_2 given off in respiration thus constantly renewing the O_2 supply. Sealed into a dry tube exhausted of air, leaves of *Aucuba* placed in the dark remain living 2 or 3 days by means of intracellular respiration. Placed in light they remain alive more than 2 months by reason of the establishment of a cycle in which the respired CO_2 is decomposed to yield O_2 ; this the colorless leaves found on weak branches are wholly unable to do.—*Joseph S. Caldwell.*

5227. RAY, GEORGE B. Comparative studies on respiration. XXIV. The effects of chloroform on the respiration of dead and of living tissue. *Jour. Gen. Physiol.* 5: 469–475. *Fig. 1–4.* 1923.—By use of H_2O_2 and $Fe_2(SO_4)_3$, powdered dead *Ulva* and chloroform gave results comparable to those obtained by action of chloroform upon living tissue. The effect

of chloroform upon a mixture of H_2O_2 and $\text{Fe}_2(\text{SO}_4)_3$ depends upon the concentration of the iron. If the concentration is low there is an increase in the production of CO_2 , followed by a decrease. If the concentration is high the rate appears to decrease from the start.—O. L. Inman.

5228. ROUGE, E. **Le réveil de la terre (réponse aux deux récentes communications de M. Auguste Lumière, Lyon).** [The awakening of the earth (a reply to 2 recent communications of August Lumière).] Bull. Soc. Bot. Genève 13: 13-16. 1921.—August Lumière says that the cause of seasonal rhythm and the awakening of the earth are independent of variations in temperature. Experiments with germinating seeds indicate that Lumière's theory of the rôle of atmospheric O_2 and chemical changes in the soil does not explain the cause for renewed growth in the spring.—W. H. Emig.

5229. WAKSMAN, SELMAN A., and ROBERT L. STARKEY. **On the growth and respiration of sulphur-oxidizing bacteria.** Jour. Gen. Physiol. 5: 285-310. Fig. 1-6. 1923.—*Sulfomonas thiooxidans* is shown to be a sulphur-oxidizing bacterium. It oxidizes elementary sulphur to sulphuric acid and sodium thiosulphate to sulphate. The organism derives its carbon from the CO_2 of the air. Sulphates do not exert any injurious effect upon sulphur oxidation by *Sulfomonas thiooxidans* but nitrates exert a distinctly injurious action both on the growth and respiration of the organism. Dextrose below 5 per cent shows no deleterious effects. The oxidation of sulfur takes place normally at 0.25 molar acid, but that concentration may be greatly increased without bad effect. Using a respirometer like that of Meyerhof the respiration of growing cultures was studied.—O. L. Inman.

5230. WAKSMAN, SELMAN A., and ROBERT L. STARKEY. **Energy transformations by micro-organisms.** [Abstract.] Absts. Bact. 7: 7. 1923.—*Thiobacillus thiooxidans* obtains its energy from the oxidation of elementary sulphur, thiosulphate, and sulphides, and its carbon from CO_2 of the air. For every part of carbon assimilated about 32 parts of sulphur are oxidized; 6.7 per cent of energy made available in the oxidation is used for the assimilation of carbon.—D. Reddick.

ORGANISM AS A WHOLE

5231. EDWARDS, S. F. **A note on the longevity of some cultures of *B. radiculicola*.** [Abstract.] Absts. Bact. 7: 9. 1923.—*Bacillus radiculicola* from red clover [*Trifolium pratense*] was kept alive and virulent in a sealed test-tube for 16 years. Similar cultures from white clover [*T. repens*] and from alfalfa [*Medicago sativa*] were kept for 10 years.—D. Reddick.

5232. HASTINGS, E. G. **A comparison between the resistance to an unfavorable environment of organisms that have grown in native habitats and the same kind grown in artificial culture.** [Abstract.] Absts. Bact. 7: 6. 1923.

5233. LENDNER, A. **Culture expérimentale de *Spinellus macrocarpus*.** [Experimental culture of *Spinellus macrocarpus*.] Bull. Soc. Bot. Genève 13: 8-9. 1921.—*Spinellus macrocarpus*, a parasitic fungus on *Mycena epipterigia*, was grown on an infusion of *Tricholoma terreum*.—W. H. Emig.

5234. SHERMAN, J. M., and W. R. ALBUS. **The function of "lag" in bacterial cultures.** [Abstract.] Absts. Bact. 7: 7. 1923.—"Instead of viewing the latent period as an expression of injury received by the organism in its previous environment, we feel that a more satisfactory explanation would be to consider it as a biological rejuvenescence."—From Author's Abstract.

5235. YOUNG, C. C., and M. GREENFIELD. **Observations on the viability of the Bacterium coli group under natural and artificial conditions.** Amer. Jour. Public Health 13: 270-273. 1923.

5236. TROTTER, H. **Height growth of seedlings.** *Indian Forester* 48: 640-644. *Pl.* 19. 1922.—Monthly height determinations of selected seedlings 1 year old were made at Dehra Dun. Tables and a chart are given showing the growth in inches by months for *Shorea robusta*, *Cedrela Toona*, *Acacia catechu*, *Dalbergia sissoo*, *Bombax malabriculum*, and *Terminalia tomentosa*. The growth curves for some of the species follow closely the form of the precipitation curve.—*E. N. Munns.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

5237. NEWCOMBE, F. C. **Response of sensitive stigmas to unusual stimuli.** Rept. Michigan Acad. Sci. 22: 145-146. 1920.—When wheat flour is placed upon the stigmas and the latter are touched gently, they close in the species studied and remain closed in *Tecoma radicans* L. Juss. and *Catalpa speciosa* Warder, but reopen in *Mimulus glabratus* HBK. var. *Jamesii* (T. & G.) Gray. If pollen is used in the place of the wheat flour the stigmas remain closed in all 3 and if emery powder is used the stigmas of all 3 reopen in 10-30 minutes. Immersion of the pistil with open stigma lobes in water does not cause closing. A drop of water placed on the stigmas in the act of closing causes a reversal of movement. Immersion in alcohol or hot water causes very prompt closing. A weak electric current causes prompt closing with subsequent reopening. Cutting through the style within 2 mm. of the stigmas causes no closing, but pinching or pressing the style, even 10 mm. away from the stigmas, causes the latter to close. Probably the closing is due to extrusion of water from a turgid tissue.—*Ernst A. Bessey.*

5238. SNOW, R. **The conduction of excitation in Mimosa.** *Nature* 111: 237. 1923.—The writer reviews briefly the work of Ricca and others which seems to show that conduction is by dissolved substances in the water stream. Dutrochet used *Mimosa Spegazzinii* in which it is possible to remove easily the tissues outside the cambium. In that species, basipetal conduction takes place with difficulty, but in *M. pudica* it takes place easily and rapidly. Such conduction may not be dependent upon the water current only, and further work is desirable.—*O. A. Stevens.*

GERMINATION, RENEWAL OF ACTIVITY

5239. BURKE, GEORGINA S. **Dormancy in spores of Clostridium botulinum.** [Abstract.] Absts. Bact. 7: 11. 1923.—Spores on nutrient agar remained dormant for 92 days and in broth for 144 days.—*D. Reddick.*

5240. PETRY, E. J. **Germination and growth of Ceanothus americanus as affected by heated soils.** Rept. Michigan Acad. Sci. 22: 135-143. *Pl.* 13-14. 1920.—For seeds treated in various ways, viz., scarified, acid-etched, or untreated, and using 3 types of soils sterilized at various steam pressures, it was determined that for certain types of soil, toxic substances are liberated by the heating which reduce or even prevent germination, while other soils are not thus affected. The effect of such soils upon the further growth of the seedlings was also followed.—*Ernst A. Bessey.*

TEMPERATURE RELATIONS

5241. ESTY, J. RUSSELL. **The heat resistance of B. botulinus spores.** [Abstract.] Absts. Bact. 7: 6. 1923.—In all, 112 strains of *Bacillus botulinus* were tested. Heat resistance at 105°C. varies from 3 to 75 minutes. Maximum resistance is 330 minutes at 100, 33 at 110, 11 at 115, and 4 at 120°C.—*D. Reddick.*

5242. MCALPINE, JAMES G. **The influence of autoclave sterilization on carbohydrates in culture media.** [Abstract.] Absts. Bact. 7: 5. 1923.—Sucrose is relatively stable when heated in a neutral buffered medium for 15 minutes at an extra pressure of 15 pounds while maltose and lactose undergo partial hydrolysis.—*D. Reddick.*

RADIANT ENERGY RELATIONS

5243. COONS, G. H., and EZRA LEVIN. The relation of light to pycnidium formation in the Sphaeropsidales. Rept. Michigan Acad. Sci. 22: 209-213. Fig. 1. 1920.—Thirty-two species of Sphaeropsidales, isolated mainly by the junior author, and grown from single spores, were cultivated in diffuse daylight, in the dark, and under electric light, under similar conditions of ventilation and temperature, each fungus being grown on 3 media,—cornmeal agar, oatmeal agar, and prune-juice agar. Sixteen of the species produced pycnidia only in the illuminated cultures, 16 produced pycnidia in both light and darkness, while 2 of those in the diffuse daylight actually reduced the number of pycnidia. The results showed no close relation as between light influence and the generic affinities of the species.—*Ernst A. Bessey.*

5244. REINLE, HANS. Über die Wirkung der Becquerel- und Röntgenstrahlen sowie des ultravioletten Lichtes auf die Peroxydase und Methylenblau-Formalin-Reduktase-Reaktion der Kuhmilch. [On the effects of Becquerel and Roentgen rays and of ultraviolet light on the peroxidase and methyleneblue-formalin-reductase reaction of cow's milk.] Biochem. Zeitschr. 115: 1-21. 1921.—The writer found that the Becquerel and the Roentgen rays had no effect upon the activity of the peroxidase and the aldehyde reductase of milk. The Becquerel rays were obtained from $RaCl_2$. It was found that the 1st hour's exposure of the milk to ultraviolet light had no effect upon either the peroxidase or reductase activity, but further exposure was somewhat harmful.—*F. G. Gustafson.*

5245. SEMMENS, ELIZABETH SIDNEY. Effect of moonlight on the germination of seeds. Nature 111: 49-50. 1923.—Increased velocity of germination has been found, and it is suggested that this effect is upon the diastase and is due to the plane-polarization of the moon light at certain periods. Experiments on various starches in polarized light seem to confirm this explanation.—*O. A. Stevens.*

TOXIC AGENTS

5246. BERTRAND, GABRIEL, et M. MOKRAGNATZ. Sur la présence du cobalt et du nickel chez les végétaux. [The presence of cobalt and nickel in plants.] Compt. Rend. Acad. Sci. Paris 175: 458-460. 1922.—Results of these studies are positive for nickel in all plants studied, and positive for cobalt only in carrot and oats. The plants studied are: roots of carrot, bulbs of onion, tubers of potato, leaves of spinach, leaves of lettuce, leafy shoot of cress, fruit of tomato, pericarp of apricot, seed and shells of beans, seed of lentils, seed of buckwheat, seed and bran of wheat, corn, rice, and the chanterelle fungus.—*C. H. Farr.*

5247. EATON, SYLVIA M., and HARPER F. ZOLLER. Some studies on the bactericidal action of sodium hypochlorite in cow's milk. [Abstract.] Absts. Bact. 7: 21-22. 1923.

5248. FALTA, W., und M. RICHTER-QUITTNER. Über die sogenannte oligodynamische Wirkung von Schwermetallen und Schwermetallsalzen. [Investigation on the so-called oligodynamic action of heavy metals and their salts.] Biochem. Zeitschr. 115: 39-41. 1921.—The heavy metals Cu, Hg, Ag, Pb, Sn, Zn, Al, Fe, Mg, and Pt were investigated, their effectiveness decreasing in the order named. The metals were placed in water in glass tubes for 8 days, after which the water was poured out and the tubes rinsed several times with distilled water and then filled with the solution to be employed. The authors studied the effect of these metals on: (1) easily oxidizable substances, such as guaiac, benzidine, resorcin, and potassium permanganate; (2) color substances like methylene blue, indigo blue, and malachite green leucobase; (3) coagulation of protein solutions; and (4) hydrolysis of starch to sugar. From these studies they concluded that the reactions are of the nature of catalysis. The ions are the active constituents; these are adsorbed by the glass tube and later pass into the solution giving a very dilute solution of the metal in question.—*F. G. Gustafson.*

5249. LEVINE, MAX and JOHN C. WELDIN. **Germicidal efficiency of a boric acid canning compound.** [Abstract.] Absts. Bact. 7: 5-6. 1923.—The compound consists of about 95 per cent boric acid and 5 per cent sodium chloride. It has little germicidal value at the concentration recommended.—D. Reddick.

5250. WILSON, H. F., and W. A. HADFIELD. **The effect of sodium hypochlorite upon the spores of American foul brood.** Science 57: 334. 1923.—Experiments show that the spores of *Bacillus larvae* are destroyed by special solutions of sodium hypochlorite and such solutions can be used to disinfect hives and combs. The bees are not poisoned by eating the chemical.—C. J. Lyon.

5251. YOUNG, H. C., and C. W. BENNETT. **Studies in parasitism. I. Toxic substances produced by fungi.** Rept. Michigan Acad. Sci. 22: 205-208. 1920.—The paper presents a study of the toxic principle produced by a virulent strain of *Fusarium oxysporum* Schl. The fungus was grown in Richards solution at pH 5, using 300 cc. for each culture in a 500 cc. Ehrlenmeyer flask. After 10 days the fungus had produced a heavy mat. Initially, and every 3rd day thereafter, the solution was removed from a culture, the pH determined and the filtrate, diluted with an equal amount of distilled H₂O placed in vials into which were placed the cut ends of freshly cut stems of potato (*Solanum tuberosum*), tomato (*Lycopersicum esculentum*) and celery (*Apium graveolens*). The check, cut potato stem placed in pure H₂O, wilted after 48 hours. The potato stem in the *Fusarium* culture medium wilted in 8 hours in the case of a culture 40 days old and in 42 hours for the 10-day-old culture. For the tomato the corresponding times were 8 and 24 hours, respectively, but for the 20- and 24-day-old cultures the time required was 36 hours. The celery wilted in 8 hours for the 20-day-old culture, 24 hours for the 24-day-old culture, and 12 hours for the 40-day-old culture. The pH of the culture solution changed toward the acid side until it reached 3.8 on the 10th day, then turned toward the alkaline side, reaching 5.2 the 24th day, and 7.4 the 40th day. The potato wilted more rapidly the older the culture, but the tomato and celery responded to the wilting least when the pH of the culture solution approached that of the plant juices, 4.8-5.6. An alkaloid was extracted from the culture fluid which when redissolved caused wilting, but much less rapidly. On the other hand, the alcoholic precipitate of the filtrate on being redissolved caused rapid wilting.—Ernst A. Bessey.

5252. ZOLLER, HARPER F., and SYLVIA M. EATON. **The phenol coefficient and relative disinfecting power of sodium hypochlorite.** [Abstract.] Absts. Bact. 7: 6-7. 1923.—The phenol coefficient ranges from 42.8 for *Bacillus tuberculosis* to 330. for *Proteus vulgaris*.—D. Reddick.

MISCELLANEOUS

5253. AYERS, S. HENRY, and COURTLAND S. MUDGE. **The streptococci of souring milk.** [Abstract.] Absts. Bact. 7: 11-12. 1923.—*Streptococcus kefir* predominates at first but as the acidity increases *S. lactis* supersedes it.—D. Reddick.

5254. BURKE, VICTOR, and MABEL ASHENFELTER. **A modification of the Gram stain for the differential staining of bacteria in milk.** [Abstract.] Absts. Bact. 7: 24-25. 1923.

5255. CLARK, WM. MANSFIELD. **Progress on oxidation-reduction indicators.** [Abstract.] Absts. Bact. 7: 2-3. 1923.—“The outstanding feature of the work is the establishment of accurate quantitative data where there has hitherto been guess work.”—From Author's Abstract.

5256. COHEN, BARNETT. **Some new sulfophthalein indicators.** [Abstract.] Abst. Bact. 7: 3. 1923.—The indicators and the pH range covered by each are as follows: Brom-chlor phenol blue, 3.2-4.8; brom cresol green, 4.0-5.6; meta cresol purple, 0.5-2.5 (red-yellow) and 7.6-9.2 (yellow-purple); chlor phenol red, 5.0-6.6; brom phenol red, 5.4-7.0.—The apparent dissociation constants at 20°C. have been determined, and redeterminations made for the Clark and Lubs series, and these are presented in tabular form.—D. Reddick.

5257. PRUCHA, M. J., and J. M. BRANNON. Persistence of *Bacterium typhosum* in ice cream. [Abstract.] Absts. Bact. 7: 8. 1923.—The organism was alive in small number at the end of 11 months and 15 days when stored at -4°F .—*D. Reddick*.

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 4723, 4728, 4731, 4733, 4734, 4735, 4737, 4738, 4744, 4745, 4748; 4753, 4754, 4786, 4796, 5003, 5012, 5023, 5026, 5181, 5203, 5207, 5208, 5229, 5230, 5240, 5246)

5258. BAUER, F. C. The foraging power of plants for rock phosphate. Jour. Amer. Soc. Agron. 15: 99-109. 1923.—A general discussion is presented. It is concluded that the laws of mass action and chemical equilibrium satisfactorily explain the foraging power of plants for phosphate rock.—*F. M. Schertz*.

5259. BURGESS, PAUL S. The reaction of soils in the field as influenced by the long-continued use of fertilizer chemicals. Rhode Island Agric. Exp. Sta. Bull. 189. 35 p. 1922.—The determinations of pH and "lime requirement" is regarded as a partial basis for correlation between the soil reaction and growth of crop plants. The commercial carriers of phosphorus tend to reduce soil acidity, organic nitrogen and sulphate of ammonia to increase it, and potassium slightly to reduce acidity.—*B. L. Hartwell*.

5260. CROCKER, WILLIAM. The necessity of sulphur carriers in artificial fertilizers. Jour. Amer. Soc. Agron. 15: 129-141. 1923.—The subject is discussed according to the following topics: function of sulphur in crops; sulphur and phosphorus content of soils, both absolute and as measured by crop removal; the increments in the soil content of sulphur from the atmosphere and the loss from the soil by leaching; effect of sulphur carriers upon crop yield. The formative effects of sulphur on legumes are manifested by an increased absorptive system, an increased nitrogen-fixing apparatus, and a modified carbohydrate mechanism.—*F. M. Schertz*.

5261. GAINNEY, P. L. The inoculation of soil with *Azotobacter*. [Abstract.] Absts. Bact. 7: 22. 1923.

5262. GIRARD, ANTOINE CHARLES. Les engrais, emploi raisonné et lucratif. [The proper and profitable use of fertilizers.] 163 p. Librairie agricole de la maison rustique: Paris, 1922[?].

5263. HASKELL, S. B. Methods of distribution of phosphorus fertilizers. Jour. Amer. Soc. Agron. 15: 141-152. 1923.—Superphosphate, carrying a low percentage of water-soluble substances, applied alone is comparatively safe in any reasonable application, almost without regard to the method of application. When superphosphate comes in contact with the seed it is much safer than a complete mixed fertilizer. The retarding effect of fertilizers on germination varies with the crop, the soil, and with moisture conditions. Under humid conditions a local application of fertilizer may be more beneficial and economical than broadcast distribution. On drier western [U. S. A.] soils, as the benefit from localized application becomes relatively less, the danger of overstimulation of the crop becomes relatively greater.—*F. M. Schertz*.

5264. HORNER, W. W. Rainfall and run-off studies in St. Louis. Sprinkling experiments at Washington University. Municipal and County Engineering 63: 176-180. 1922.—Beds experimented with are $\frac{1}{16}$ acre in area; measured quantities of water are applied by hose and sprinklers at various rates and the run-off information obtained by accurately measuring the water collected from the experimental area in sub-drains. The experiments, part of

which have been completed, are being conducted on the Washington University campus for (1) typical soil conditions on the campus; (2) bare soil and sod covering; (3) surface slopes of 10, 5, and 0.08 per cent. It was found that the relation between total rainfall and run-off for each experiment could be represented with a fair degree of accuracy by a straight line. From this line 2 factors developed, (1) the intercept of the line on the rainfall axis gives the amount of water in cubic feet necessary to produce a normal surface film, and (2) the slope of the line indicates the rate of absorption (and possibly evaporation) during the run. The figures for volume required to produce a surface film and volume lost by absorption were divided by the amount of water applied and the results taken to represent the percentage of rainfall required for the surface film and percentage lost through absorption; and they checked almost perfectly against experimental run-off figures.—*A. E. Gorman.*

5265. JOFFE, JACOB S. **Acid phosphate manufacture by a biological process.** [Abstract.] *Absts. Bact.* 7: 19. 1923.—If suitable conditions are supplied it is possible to secure acid phosphate in 18 weeks by means of the sulphur-oxidation process.—*D. Reddick.*

5266. LOVEJOY, P. S. **The effect of forest fires upon the soil of the northern lake states.** *Rept. Michigan Acad. Sci.* 22: 9-20. 1920.—Arguments and evidence are submitted controverting the statements of some investigators that forest fires are beneficial, or at least not harmful to the soil.—*Ernst A. Bessey.*

5267. OSUGI, S. **On the catalytic action of soils.** *Ber. Ohara Inst. Landw. Forsch.* 2: 197-218. 1922.—The catalytic action of soil, or the power of soil to decompose H_2O_2 with the liberation of O_2 , was found to vary with the physical condition of the soil particles. Any treatment which increases the quantity of colloidal substances in the soil lessens catalysis, while peptinization of the soil particles speeds up the reaction. An alkaline reaction accelerates catalysis, and an acid reaction retards it to some extent. This is due partly to change in the physical state of the soil particles and partly to the reaction itself. Experiments conducted to determine the effect of the chemical nature of soil on its catalytic activity has led the writer to believe that humus, manganese, and iron may be the main constituents which give the soil catalytic power, although he could not obtain any quantitative relation between soil activity and soil-content of these constituents. The effect of bacteria on soil catalysis is slight, but that of enzymes is very marked.—*Margaret Buvens.*

5268. POWERS, W. L. **Progress of sulphur investigations with Oregon soils.** *Jour. Amer. Soc. Agron.* 15: 158-160. 1923.—A review of the sulphur investigations at the Oregon Experiment Station is given.—*F. M. Schertz.*

5269. SCHREINER, OSWALD. **Organic phosphorus in soils.** *Jour. Amer. Soc. Agron.* 15: 117-124. 1923.—Proof is offered of the existence of organic phosphorus in soils by the isolation of at least 1 definite organic compound containing it, namely, nucleic acid. Lecithins, phytins, nucleic acids, nucleo-proteins, and other complex compounds contain phosphorus in an organic form. The decomposition of nucleo-proteins and nucleic acids is discussed and it is pointed out that nucleic acid has a decided growth-promoting property not equalled by that of the usual inorganic nitrates or phosphates.—*F. M. Schertz.*

5270. SHERWIN, M. E. **The effect of fertilizers on germination and seedling growth.** *Jour. Amer. Soc. Agron.* 15: 66-73. 1923.—Fertilizers generally inhibit germination. The inhibition is greater when the fertilizer is in direct contact with the seed than when it is mixed with the soil, and is generally proportional to the quantity of fertilizer used. It is greater with the more soluble mineral fertilizers than with the less soluble mineral or organic materials. Apparently the inhibiting action is not due to a direct effect of the fertilizers upon the viability of the seed, but to a retarding influence upon the osmotic absorption of water from the soil by the seed, in the case of the soluble mineral fertilizers. The presence of organic fertilizers stimulates the growth of fungi, which are injurious to the root system of

young seedlings. Borax in amounts as small as 3.5 pounds per acre exerts a marked inhibiting effect upon root growth.—*F. M. Schertz.*

5271. TRUOG, E. **Determining the phosphorus needs of soils.** Jour. Amer. Soc. Agron. 15: 110-117. 1923.—A less expensive and more rapid method is needed for determining the phosphorus requirement of soils in regions like Wisconsin, because of the great natural variation in the soils. A tentative table gives the minimum percentages of phosphorus deemed adequate for general farming in Wisconsin under different soil conditions.—*F. M. Schertz.*

5272. WAKSMAN, SELMAN A. **Methods in soil microbiology.** [Abstract.] Absts. Bact. 7: 18-19. 1923.

5273. WIEDMER, F. **Peat as a fertilizer ingredient.** Jour. Amer. Peat Soc. 16: 52-54. 1923.—Peat is useful as a base for fertilizers on account of its high absorbency and its deodorizing properties. Some peat contains "available" nitrogen, but this must be determined for each kind of peat.—*G. B. Rigg.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See in this issue Entries 4718, 4719, 4750, 4752, 4774, 4855, 4869, 4989, 5007, 5101, 5112, 5154, 5675, 5676)

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*

S. F. TRELEASE, *Assistant Editor*

5274. BALL, E. D. **Agricultural research as a career.** Science 57: 597-601. 1923.

5275. BEAUVERD, G. **L'herbier du Dr. Louis Bouvier à L'institut de Botanique.** [The herbarium of Dr. Louis Bouvier at the Botanical Institute.] Bull. Soc. Bot. Genève 13: 7. 1921.

5276. FUENTES, F. **Informe de la seccion de plantas fanerogames.** [Report of the section of phanerogamic plants.] Bol. Mus. Nacion. Santiago 11: 266-269. 1918/19 [1920].

5277. GAGER, C. STUART. **A proposal for wild flower conservation.** Science 57: 52-54. 1923.—In 1921 the Vermont legislature passed a general game law for plants, which places a list of rare plants under complete protection from commercial collections and restricted collection by botanists. The American Fern Journal for Sept., 1922, contains an article on the use of this method by other states [see Bot. Absts. 12, Entry 4706]; reprints are available for general distribution.—*C. J. Lyon.*

5278. HOLMAN, RICHARD. **Use of the carbon dioxide freezing attachment on the rotary microtome.** Science 57: 363-364. 1923.—The use of a CO₂ freezing attachment is possible if a flexible, thin-walled copper tube is used to deliver the gas to the freezing chamber.—*C. J. Lyon.*

5279. KELLOGG, VERNON. **National research fellowships in the biological sciences.** Science 57: 373-375. 1923.

5280. LIDDELL, MARK H. **The endowment of scientific research.** *Science* 57: 612-613. 1923.

5281. QUER, F. **El Department de Botanica en 1918.** [Report of the botanical department for 1918.] *Ann. Junta Cien Nat.* [Barcelona] 3: 137-142. 1918 [1921].

5282. RANSON, R. **The Florida Everglades.** *Jour. Amer. Peat Soc.* 16: 55-59. 1923.—Four million acres of the Everglades may be described as one immense peat bog, containing almost every known kind of peat.—*G. B. Rigg.*

5283. THARALDSEN, C. E. **Furfural as a biological reagent.** *Science* 57: 305-306. 1923.—Furfural is now made in commercial quantities from oat hulls. Its chemical properties resemble those of formaldehyde. It may be used as a preservative, a vehicle of stains, and a general solvent in micro-technique. As a preservative it is best used as a concentrated (8 per cent) aqueous solution; it does not harden or shrink tissues but it does impart a slight yellowish-brown tinge. It dissolves coal tar dyes, alcohol, xylene, balsam, parlodion, and other reagents.—*C. J. Lyon.*

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J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12

OCTOBER, 1923
ENTRIES 5283-6131

No. 8

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 5390, 5394, 5395, 5410, 5458, 5464, 5504, 5558, 5621, 5628, 5817, 5873, 5921, 5935, 5938, 5982, 5995, 5996, 6006, 6008, 6010, 6011, 6012, 6013, 6015, 6016, 6018, 6019, 6020, 6021, 6022, 6025, 6026, 6028, 6030, 6031, 6124)

5284. ANONYMOUS. College Algerians: A new strain of oats. New Zealand Jour. Agric. 26: 147-148. 1923.—This is an unusually high yielding strain of oats.—*N. J. Giddings*.

5285. ANONYMOUS. Ensilaje de alfalfa. [Alfalfa silage.] Rev. Soc. Rural Córdoba [Argentina] 21: 6027-6030. 1922.—Directions are given for making silage from alfalfa under conditions prevailing in Argentina.—*John A. Stevenson*.

5286. ANONYMOUS. Flax cultivation in Victoria. Jour. Dept. Agric. Victoria 19: 108. 1921.—The area sown with flax in Victoria increased from 400 acres in 1917 to about 2,000 acres in 1920. To stimulate the grower's interest in the production of flax the Commonwealth Government made a guarantee and offered a dividend over and above the cost of milling and administrative expenses. Brief notes on cultural practices are given.—*Mary R. Burr*.

5287. ANONYMOUS. Oversigt over Statens Forsøg i Plantekultur i Fanansaaret 1923-1924. [Plans for the State Agricultural Experiment Stations for the fiscal year 1923-1924.] Tidsskr. Planteavl 29: 143-159. 1923.

5288. ANONYMOUS. [Rev. of: McCALL, J. S. A handbook on cotton and tobacco cultivation in Nyasaland: a guide to prospective settlers. 85 p. Government Printer: Zomba, Nyasaland, 1920 (see Bot. Absts. 12, Entry 5354).] Nature 109: 337-338. 1922.

5289. ARBUCKLE, H. B., and O. J. THIES, JR. Variation of protein content of corn. Jour. Elisha Mitchell Sci. Soc. 38: 84-87. 1922.—Grain resulting from West Virginia-grown seed planted at Davidson, North Carolina, showed a marked reduction in protein. A modification of the Kjeldahl method was employed in determining the nitrogen content. There is about 1 month's difference in season between the 2 localities.—*W. C. Coker*.

5290. BAILEY, L. H. (Editor.) *Cyclopaedia of farm crops: a popular survey of crops and crop-making methods in the United States and Canada.* 669 p., 25 pl. 907 fig. The Macmillan Co.: New York and London, 1922.—Part I, of 7 chapters, covers structures and physiology, insects and diseases, breeding, plant introduction, crop management and weeds, growing under cover, seeding, planting and yields. Part II, of 2 chapters, covers preserved products, juices, and liquors. Part III covers North American field crops. Each chapter is subdivided into several parts and each is treated by a well known specialist. [See also Bot. Absts. 12, Entry 5360.]—*P. L. Ricker.*

5291. BARKER, EUGENE E. *Como seleccionar y cuidar la semilla de maiz para la proxima siembra.* [Selection and care of seed corn for the next crop.] *Rev. Agric. Puerto Rico* 64: 9-19. 6 fig. 1921.—Methods of selecting and storing seed corn under Porto Rican conditions, so as to improve the crop in yield and quality, are discussed.—*John A. Stevenson.*

5292. BARTLETT, H. *Farmers' experiment plots. Winter green fodder experiments, 1922. Western district.* *Agric. Gaz. New South Wales* 34: 251-254. 1923.—Due to the increase of certain wheat diseases crop rotation to include forage crops has become of increasing importance. Experiments undertaken cooperatively with 8 farmers in the production of forage crops, are described. Production is given in amounts of stock carried.—*L. R. Waldron.*

5293. BEAUVERIE, J. *Influence de la hauteur d'eau météorique pendant que la "période critique" du blé sur le rendement.* [The influence of the amount of rainfall during the "critical period" on the yield of wheat.] *Compt. Rend. Acad. Sci. Paris* 176: 707-709. 1923.—Azzi has called the stage of development during which the plant most needs water, the "critical period." For wheat this has been found to be the 30 days preceding and during the time of heading. A comparison has been made of the yield of wheat in the Department of Puy-de-Dôme for 21 years, 1901-1922, and the rainfall records for this region. The 2 graphs are shown and their rather close correspondence discussed. The rainfall varied from 70 to 160 mm.—*C. H. Farr.*

5294. BERKNER. *Der Einfluss der Jahreswitterung auf Höhe und Güte der Erträge unserer Feldfrüchte.* [The influence of the annual weather conditions on the size and quality of the yield of our field crops.] *Illus. Landw. Zeitg.* 42: 267-269, 276-277. 1922.—The effect of weather conditions on the yield and quality of the various crops, including optimum weather conditions for high yield and high quality, are discussed. It is maintained that by the selection of varieties adapted to local conditions of soil and climate, yields can be greatly increased both in size and in quality.—*John W. Roberts.*

5295. BLAKELY, W. F. *Weeds of New South Wales.* *Agric. Gaz. New South Wales* 34: 286-291. 3 fig. 1923.—*Euphorbia prostrata*, *E. thymifolia*, and *E. Preslii*, weeds introduced into Australia, are figured and described and methods of eradication are discussed.—*L. R. Waldron.*

5296. BLAKELY, W. F. *Weeds of New South Wales.* *Agric. Gaz. New South Wales* 34: 332-336. 2 fig. 1923.—Blessed thistle (*Cnicus benedictus*) and small-fruited devil's claw (*Martynia diandra*) are figured and described and methods of eradication and control are discussed. Neither plant is at all common.—*L. R. Waldron.*

5297. BRAMBILA, ALEJANDRO. *Establecimiento de semilleros de tabaco en terrenos esterilizados.* [Establishment of tobacco seed beds in sterilized soils.] *Rev. Agric. [Mexico]* 7: 305-307. 7 fig. 1922.—Methods of sterilizing tobacco seed beds with steam in order to prevent damping off are described.—*John A. Stevenson.*

5298. BRUNE, F. *Ueber vergleichende Kartoffelsortenversuche auf verschiedenen Bodenarten in den Jahren 1920 und 1921.* [Comparative experiments with potato varieties on different soil types.] *Illus. Landw. Zeitg.* 42: 259-260. 1922.—The experiments were con-

ducted with 26 potato varieties on high moor, low moor, sand, and marsh soils. The results show yield of tubers, comparative rating of the varieties based on the yield, and also the starch content of each variety.—*J. C. Dunegan*.

5299. CABRERA, PABLO MORALES. *Henequen y piño*. [Henequen and pineapple.] *Rev. Agric. Puerto Rico* 9²: 39-42. 1922.—The author gives a brief account of the uses and methods of preparing the fibers of *Agave* and of *Ananas*. The possibilities of growing the 2 plants for their fiber in Porto Rico are discussed.—*John A. Stevenson*.

5300. CALVINO, MARIO. *La caña Uba del Natal*. [The Uba cane of Natal.] *Rev. Agric. Puerto Rico* 7¹: 17-26. 1921.—The results of chemical tests of the sugar cane variety Uba or Kavangire at the Cuban experiment station in comparison with other standard varieties are given.—*John A. Stevenson*.

5301. CAUTHEN, F. F., AND J. T. WILLIAMSON. *Time of applying nitrate of soda to corn*. Alabama Agric. Exp. Sta. Bull. 210. 17-32. 1920.—Before the advent of the boll weevil, 100 pounds of nitrate of soda per acre to corn plants 2½ feet high gave an average increase of 7.5 bushels. When in addition an equal amount was added just before time to tassle, there was an increased production, and a still greater one when 240 pounds were applied.—More recent experiments indicate that 100 pounds of nitrate of soda when corn plants are 2½ feet high give the greatest increase of seed corn per acre.—*Wright A. Gardner*.

5302. CHARDÓN, CARLOS E. *El "Coque"*. [Nutgrass.] *Rev. Agric. Puerto Rico* 9²: 45-46. 2 fig. 1922.—A description is given of the plant known as coqui or nutgrass (*Cyperus rotundus*), widely distributed as a weed in Porto Rico, particularly in sugar cane fields where it harbors a new species of leafhopper (*Carolinia*) recently demonstrated to be a carrier of the mosaic disease.—*John A. Stevenson*.

5303. CHRISTIANSEN, EDV. *Dyrkningsforsøg med Sorter og Stammer af Havegulerødder og Rødbeder*. 1919-1921. [Experiments with varieties of garden carrots and beets 1919-1921.] *Tidsskr. Planteavl* 29: 117-142. 1923.—This is a report of government experiment station results.—*Albert A. Hansen*.

5304. COLON, E. D. *Trabajos de investigacion durante el año fiscal de 1919-1920*. [Investigational work during the fiscal year 1919-20.] *Rev. Agric. Puerto Rico* 6³: 7-14. 1921.—The director reviews the work of the Insular Experiment Station. Particular attention was given to sugar cane varieties in connection with studies of the mosaic disease. A start was made in the improvement of rice, corn, and tobacco varieties. Fertilizer tests with pineapples were carried on.—*John A. Stevenson*.

5305. CROSS, W. E. *Ensayos de cultivo de caña con caupi en las trochas*. [Experiments in cane cultivation with cowpeas interplanted.] *Rev. Indust. y Agric. Tucuman* 12: 99-102. 1 fig. 1922.—Experiments have been carried on for 4 years to test the effect of interplanting legumes (cowpeas) on yield of sugar, using the variety P.O.J. 213. The cowpeas were planted as soon as moisture conditions permitted after the ratooning cane had been cultivated for the first time. Check plots adjoined those in which the cowpeas were planted. The results indicated that not only was there no increase in the legume plots but that there was a decrease in yields as compared with the check plots, with evidence of actual injury to the cane.—*John A. Stevenson*.

5306. CROSS, W. E. *Ensayos sobre el cultivo de la caña sin quemar la maloja*. [Experiments in cane cultivation without burning the trash.] *Rev. Indust. y Agric. Tucuman* 12: 103-110. 1922.—It is customary in Tucuman to burn the trash after cutting the cane crop, while in some other cane growing countries it is left on the field. There are reasons to support both methods. Burning the trash makes cultivation easier and is said to cause the cane to

germinate more rapidly for the ratoon crops. Burning may also destroy fungi and insects. In Louisiana it prevents deterioration of the cane over winter. On the other hand the trash has a high fertilizing value if left on the ground and helps to hold moisture. Experimental work on this problem was started in 1916 using the variety P.O.J. 213. In one plot the trash was burned and in another dragged into the alternate rows. It was found that the idea that cane starts to germinate more quickly when the trash is burned is true only when the trash is left lying on the cane itself. The burned over plot yielded at the rate of 4,060 kgm. of sugar per hectare, the unburned plot 4,115 kgm. The yields in the one experiment were therefore practically the same but observations and tests demonstrated that the soil had been benefited greatly by non-burning of trash, a condition that would become evident with succeeding crops.—*John A. Stevenson.*

5307. CROSS, W. E. Ensayos sobre métodos de plantar la caña. I. Método Reynosa. [Experiments in cane-planting methods. I. The Reynosa method.] Rev. Indust. y Agric. Tucuman 12: 65-70. 1 fig. 1921.—A uniform plot was divided into 2 parts, 1 being planted to sugar cane by the Reynosa method, the other by the ordinary Tucuman furrow system. The Reynosa system used in Java consists of wide furrows (50-60 cm.) in which 2 lines of cane cuttings are planted, 1 on each side. The 2 plots were given uniform cultivation throughout 3 seasons. At cutting time each year the weight of cane produced was taken and determinations of sucrose and purity were made. The yields per hectare both in cane and on the basis of sugar content were practically the same but observations and tests demonstrated that the soil had been benefited greatly by non-burning of trash, a condition that would become evident with succeeding crops.—*John A. Stevenson.*

5308. CROSS, W. E. Ensayos sobre métodos de plantar la caña. II Método de plantar en hoyos. [Experiments in methods of cane planting. The method of planting in holes.] Rev. Indust. y Agric. Tucuman 12: 93-98. 2 fig. 1922.—The hole-method of planting sugar cane, in use in Barbados, Porto Rico, Mauritius, and other cane growing countries, was tested in Tucuman in comparison with the furrow system commonly used. The holes were made square 35 cm. across and 1.7 m. from center to center. The furrows were 1.8 m. apart, the distance usually employed. The variety P.O.J. 36 was used in planting both plots, 3 cuttings being placed in each hole. The usual cultivation for each type of planting was given throughout the season. The plot planted by the hole-method yielded at the rate of 2,248 kgm. of sugar per hectare, the furrow plot at the rate of 5,614 kgm. The 1st ratoon crop gave 6,294 kgm. for the hole plot and 5,804 for the furrow plot. The 2nd ratoon crop yielded 4,490 kgm. for the former and 3,996 kgm. for the latter, or 492 kgm. of sugar in favor of the hole-method of planting taking the totals for 3 years. These results are not considered conclusive and the experiment is being continued.—*John A. Stevenson.*

5309. CROSS, W. E. Estudios con variedades de cañas importadas. [Studies with imported cane varieties.] Rev. Indust. y Agric. Tucuman 12: 72-92. 6 fig. 1921.—Besides studies of Tucuman seedlings, experimental work has been carried on with many imported cane varieties, some of which are of promise under Tucuman conditions. P.O.J. 105 (Egyptian amber) has been grown experimentally for 3 years and found to be a high yielder but with little resistance to freezing. Tabular comparison is made between it and other varieties grown on a field scale as to sucrose, glucose, and purity of the juice. D1135, highly thought of in Queensland and Hawaii, has been of sufficient promise to warrant extended tests over 3 seasons. Yon Tan San of several Japanese varieties tested, was resistant to disease and freezing but was low in sugar content. Rose Bamboo proved to be the same as the Criolla or native white cane, which has no resistance to freezing or disease. A number of other varieties from Brazil, Barbados, and Peru and some of unknown origin were also grown in the experimental plots, and several were of sufficient promise to warrant further trials.—*John A. Stevenson.*

5310. CROSS, W. E. Frecuencia de cortar las cañas forrajeras. [Frequency of cutting forage canes.] Rev. Indust. y Agric. Tucuman 12: 70-72. 1921.—The variety Kavangire, grown because immune to mosaic disease, has proved satisfactory for forage but not for sugar.

The question arose as to whether it could be cut more often than once a year without causing the stools to deteriorate or lowering the total annual yield. Three year's tests have demonstrated that while total yield is somewhat reduced by more frequent cuttings, the reduction is negligible. There was no diminution of vigor in the stools of cane cut twice a year.—*John A. Stevenson.*

5311. CROSS, W. E. *Las cañas tucumanas en la cosecha del año 1921.* [The 1921 harvest of Tucuman canes.] *Rev. Indust. y Agric. Tucuman* 12: 58-62. 1921.—This is a progress report of the work at the Tucuman station with seedling sugar canes. Observations on the resistance of seedlings to freezing were made, and comparative chemical tests, including Brix, sucrose, glucose, and purity, obtained both before and after the freezing weather. The 1918 seedlings were grown as 2nd ratoons and those of 1919 as 1st ratoons. New plantings were also made and the resulting cane tested in the usual manner. Results are given in tabular form.—*John A. Stevenson.*

5312. CROSS, W. E. *Los ensayos con abonos para la caña de azucar.* [Fertilizer experiments with sugar cane.] *Rev. Indust. y Agric. Tucuman* 12: 45-57. 1921.—Fertilizer experiments have been conducted at the Tucuman station for over 11 years. During 1911-14 native varieties were employed and the results were so contradictory as to be valueless, due, it is now known, to the mosaic disease, which forced the practical abandonment of the native types in favor of the Javan canes. Experiments in 1916-18 indicated that phosphates and potash did not increase yields under Tucuman conditions. Manure tests started in previous years with Zwinga and native varieties gave increased yields for the former, while mosaic vitiated results with the latter. Ammonium sulphate was applied to 4 plots, 2 limed and 2 unlimed. The variety P.O.J. 36 gave increased yields but with a lower sugar content—a gain for the Colonas since they sell cane by weight. P.O.J. 213, also commonly grown, gave results tending in the same direction but less definite. On the whole, the author concludes, fertilizing is of doubtful value.—*John A. Stevenson.*

5313. DECHAMPAGNE, A. *Profondeur du sol pour blé.* [Depth of soil for wheat.] *Nat. Canadien* 49: 55-57. 1922.—In an old number of *Pèlerin*, Paris, it is recorded that roots of wheat will descend 50 cm. into proper soil. By the breaking up of sub-soils production over extensive regions has been increased.—*A. H. MacKay.*

5314. DERLITZKI und WEBER. *Mitteilungen aus dem Forschungsinstitut für Landarbeit Pommriß (Sachsen).* [Communications from the research institute for farm labor, Pommriß (Saxony).] *Illus. Landw. Zeitg.* 42: 235. 1922.—On the basis of experiments it is recommended that in soils which have a tendency to form a crust and to dry out quickly, seed should be planted $2\frac{1}{2}$ cm. deep rather than nearer the surface. In the absence of rain, seed planted at this depth germinates quickly and the young plants are soon visible. If rain follows the seeding, the resulting crust can be broken by harrowing, thus permitting the young plants to appear above the surface.—*John W. Roberts.*

5315. EASTERBY, H. T. *Bureau of sugar experiment stations. Annual report of the directors.* III Extract. *Australian Sugar Jour.* 15: 89-93. 1923.—The work at the Bundaberg station is detailed. Fertilizers, methods of culture, and the use of first, second and third ratoon cane for plants were tested. The third ratoons produced good cane crops.—*C. Rumbold.*

5316. FAWCETT, G. L. *Description de dos interesantes variedades de caña.* [Description of 2 interesting cane varieties.] *Rev. Indust. y Agric. Tucuman* 12: 156-160. 2 fig. 1922.—Technical descriptions are given of 2 varieties: P.O.J. 2727, a seedling recently introduced from Java and proving satisfactory under Tucuman conditions; and Chola, a soft native variety with high sugar content which has been grown only in gardens or small native plantings—it cannot be considered for use on plantation scale because of its non-resistance to mosaic and other diseases.—*John A. Stevenson.*

5317. FAWCETT, G. L. El efecto de las heladas sobre las yemas de la caña. [Effect of freezes on buds of cane.] Rev. Indust. y Agric. Tucuman 12: 32-39. 1921.—Freezing weather blackens sugar cane buds. If the temperatures are not too low, varying numbers of frozen buds will sprout. Experiments were conducted with the varieties P.O.J. 36, P.O.J. 213, D1135, and Kavangire planted at various intervals after the freezing weather. The 1st and last gave 50-75 per cent germination when planted immediately, but only 2-14 per cent when planted a month later. The other varieties failed entirely. Buds on the lower parts of the stalks proved more resistant to freezing than those higher up and were found to have a lower water content.—*John A. Stevenson.*

5318. FAWCETT, G. L. Notas sobre la clasificación de la caña morada criolla. [Notes on the classification of the native Morada cane.] Rev. Indust. y Agric. Tucuman 12: 125-127. 1 fig. 1922.—The author states that the native Morada cane of Tucuman is the same as the variety Bandjermazim hitam of Java and not Black Cheribon as claimed by Jeswiet. Variations in the bud characters of the 2 varieties are presented in support of this statement. The native striped cane (Rayada) is a mutation from the Morada and is the same as the Striped Preanger of Java. The white variation known as White Cristalina or Rose Bamboo is the same as the White Preanger of Java.—*John A. Stevenson.*

5319. FINGERLING. Die Gewinnung von Eiweiss im Inlande. [Domestic production of protein.] Mitteil. Deutsch. Landw. Ges. 38: 362-366. 1923.—In an address before the German Agricultural Society the speaker emphasized the possibility of increasing grass yields and also the percentage of protein by heavy applications of nitrogenous fertilizers and cutting the grass while very young. He had been able to increase the percentage of protein from 12 per cent in common meadow hay to 20 or 23 per cent. In order to save and utilize this high grade young grass the use of electrically equipped silos is advocated.—*A. J. Pieters.*

5320. FRUWIRTH, C. Die Saatenanerkennung. [Seed certifying.] 2nd ed., 152 p., 79 illus. Paul Parey: Berlin, 1922.—Part I is a general discussion and concerns: purpose and development of seed certifying; steps involved in, and leading to, certification; inspection requirements (general, in the field, determining the ancestry, in the harvesting and farm storage, in the warehouse); time for inspection; plot tests; seed certifying and strain certifying; conditional or unconditional certifying; inspector's equipment and qualifications.—Part II discusses the following crops with general remarks concerning the special problems, foreign field and weed seeds present, and diseases: winter wheat; winter rye; summer barley; summer oats; corn; upright legumes; procumbent legumes; potato; beet; turnip; carrot; cabbage; rape; poppy; flax; red clover; white clover; alfalfa; esparsette; grasses; miscellaneous vegetables (cucumber, melons, tomato, radish, celery, onion, etc.); orchard and forest trees; and vines.—*W. B. Lydenberg.*

5321. GEERTS, J. M. De factoren die het product bepalen. Zesde bydrage: Het product van E. K. 28. [The factors which determine the yield. Sixth contribution. The yield of E. K. 28.] Mededeel. Proefsta. Java Suikerindust. 1922: 351-389. 1922.—Sugar cane variety E. K. 28 has come into general cultivation only since 1916-1917. It has been shown to be superior in most cases to 100 P.O.J. It must be planted quite early. It yields better and lodges less on old than on new soils, and is drought resistant.—Many tables are given regarding growth and field and weather conditions influencing yields. The results from different plantations are discussed separately.—*Peter J. Klaphaak.*

5322. GEERTS, J. M. De factoren die het product bepalen. Zevende bydrage: Het product van 90 F. [The factors which determine the yield. Seventh contribution: The product of 90 F.] Mededeel. Proefsta. Java Suikerindust. 1922: 465-485. 1922.—The new sugar-cane variety, 90 F., at first very promising, is planted less and less because of its susceptibility to lodging. Under favorable conditions it produces well but lodges badly resulting in a decreased sugar content. The product is strongly influenced by the amount of lodging. The

variety is but little resistant to drought, much more sensitive than E. K. 2, E. K. 28, 247 B. It stools abundantly and has therefore been planted recently mainly on poor soils, where it lodges very little and gives a comparatively good product.—*Peter J. Klaphaak.*

5323. GEERTS, J. M. De factoren die het product bepalen. Achtste bydrage: Het product van Tjepiring 24. Negende bydrage: De varieteiten onderling vergeleken. [The factors which determine the yield. Eighth contribution: The product of Tjepiring 24. Ninth contribution: The varieties compared with one another.] Mededeel. Proefsta. Java Suikerindust. 1922: 487-531. 1922.—The sugar cane named Tjepiring 24 is very successful locally, especially in East Java (Sidoardjo). The leaves are stiff, the variety showing external signs of drought damage much later than others. Growing slowly it lodges but little on rich soils, where other varieties lodge severely. It has a long growing period and produces a good yield of sugar. Immunity to sereh and mosaic are advantages over susceptible varieties. In the 9th contribution varieties discussed in former articles are compared, the following being mentioned: 100 P.O.J., 247 B., E.K. 2, D.I. 52, Tjepiring 24, 2714 P.O.J., 2725 P.O.J., 1499 P.O.J., E.K. 28. Tables compare varieties under different conditions of weather, soil, yields, etc. 100 P.O.J. is generally replaced by E.K. 28 on the drier soils and by D.I. 52 on the moist soils. 247 B. is mainly replaced by Tjepiring 24 on rich soils (moist soils), but also by D.I. 52, E.K. 28, E.K. 2, and during recent years by 2714 P.O.J. Newer varieties have been gaining in popularity.—*Peter J. Klaphaak.*

5324. GIROLA, CARLOS D. Abrojo grande. [Giant cocklebur.] Bol. Ministerio Agric. Nacion [Argentina] 15: 1 col. pl. between pages 168-169. 1920.—The botanical characteristics, injury caused, and control of *Xanthium strumarium* are given.—*John A. Stevenson.*

5325. GIROLA, CARLOS D. Destrucción de las plantas invasoras perjudiciales, vivaces y anuales. [The destruction of annual and perennial injurious plants.] Bol. Ministerio Agric. Nacion [Argentina] 25: 165-169. 1920.—Methods for controlling or destroying weeds are given.—*John A. Stevenson.*

5326. GIROLA, CARLOS D. El cultivo de la avena en la Republica Argentina y el concurso de avenas de 1920-1921 organizado por el Museo Agrícola de la Sociedad Rural de Argentina. [Cultivation of oats in Argentina and the 1920-21 oats "show" organized by the Agricultural Museum of the Rural Society of Argentina.] Bol. Ministerio Agric. Nacion [Argentina] 27: 262-273. 4 fig. 1922.—Oats are extensively grown in Argentina, either for export or for green feed, 1,295,000 hectares having been planted in 1917-18, for the most part in Buenos Aires and neighboring provinces. Very little has been done to improve the varieties used; in fact, improved imported varieties have become mixed within a few years with the native types and so lost. The average yield is 1,000 kgm. per hectare.—*John A. Stevenson.*

5327. GIROLA, CARLOS D. Ray-grass oriolla. [Native ray grass.] Bol. Ministerio Agric. Nacion [Argentina] 26: 488-489. 1 col. pl. 1921.—The botanical characters, uses, and cultivation of *Lolium brasilianum* Nees are given.—*John A. Stevenson.*

5328. GIROLA, CARLOS D. Sorgho de Alepo. [Johnson grass.] Bol. Ministerio Agric. Nacion [Argentina] 27: 232-235. 1 col. pl. 1922.—The manner of spread of this serious weed pest is discussed and control measures are outlined.—*John A. Stevenson.*

5329. GRANEL, JOAQUIN. Cultivo del centeno. [Rye cultivation.] Rev. Soc. Rural Córdoba [Argentina] 21: 6214-6225. 1922.—Popular.—*John A. Stevenson.*

5330. GUARDIOLA, JORGE. Cultivo del ajonjolí. [Sesame culture.] Rev. Agric. [Mexico] 7: 327-332. 2 fig. 1922.—The author recommends increased plantings of *Sesamum indicum* in Mexico. Cultural directions are given, including varietal descriptions, preparation of land, seeding, cultivation, harvesting, and yields to be expected.—*John A. Stevenson.*

5331. HANSEN, JOSEF. Forsøg med Afvanding, Mergling of Kalkning, Jordlaegning og Godskning paa Højmoser ved Askov. [Experiments with the application of marl, lime, liquid manure and other manures on peat soils at Askov.] Tidsskr. Planteavl 29: 1-26. 1923.—Experiments are reported with virgin peat soils about 15 feet deep. In open ditch experiments the yield of cereals and legumes was best with a distance of 11.3 m. between ditches and least when the ditches were 22.6 m. apart. The yield of grass crops for hay was best when the ditches were 22.6 m. apart and about 20 per cent less when ditches were 5.7 m. apart. The application of 36,000 kgm. of carbonate of lime as ground chalk or clay marl per hectare gave best yield of rye, oats, and vetch, while 18,000 kgm. gave best yields of barley and oats and fair yields of legumes, oats and grass; 36,000 kgm. of lime reduced the yield of grain 10-15 per cent and reduced grass hay yields 15-20 per cent. On permanent grassland bogs with a 5 cm. layer of sand, lime and marl produced equally good results, but when a 2.5 cm. sand layer was used, marl gave an 8 per cent greater yield than lime. Where no layer of soil was laid, marl gave 33 per cent higher yields than lime. From 20 to 30 per cent increased yields of cereals and grasses were secured from nitrogen fertilizers applied to high peat bogs. Similar results were secured with Chile saltpeter, ammonium sulphate, and liquid manure, while calcic nitrogen was not effective.—The Askov Experiment Station is located in the heather and bog region of western Jutland, a region formerly considered of little value. As a result of drainage and the use of fertilizers, the region is now highly productive.—*Albert A. Hansen.*

5332. HARREVELD, J. VAN. De samenstelling van dan aanplant 1921-1922. [The planting of 1921-1922.] Mededeel. Proefsta. Java Suikerindust. 1922: 391-412. 1922.—This paper includes 8 tables giving varieties planted, amount of bouws planted for each variety, and totals for the varieties and for the plantations. The number of bouws in bibitgardens in the plains and amount of imported mountainbibit are likewise given.—*Peter J. Klapaak.*

5333. HARREVELD, J. VAN. Statistiek van de verbreiding en de productie der rietsoorten in Oogst 1921. [Statistics regarding sugarcane varieties from 1921 crop.] Mededeel. Proefsta. Java Suikerindust. 1922: 533-612. 1922.—The paper consists of tables of statistical data obtained from 172 plantations. The varieties planted and percentages of the entire cane production for Java are given as follows: E.K. 28, 38½; 247 B., 21¼; D. I. 52, 14¼; 100 P.O.J., 6½; E.K. 2, 6½; 90 F., 3; S.W. 3, 2¼; Tjepiring 24, ¼; other varieties, 6½.—*Peter J. Klapaak.*

5334. HARRISON, L. S. Graze off the paddymelons. Agric. Gaz. New South Wales 34: 285. 1923.—A suggestion is made in regard to eradication of *Cucumis Myriocarpus*.—*L. R. Waldron.*

5335. HELM, C. A., AND L. J. STADLER. Productive methods for oats in Missouri. Missouri Agric. Exp. Sta. Circ. 105. 16 p., illus. 1922.—A brief popular discussion of oats varieties and culture for Missouri is presented.—*L. J. Stadler.*

5336. HELM, C. A., AND L. J. STADLER. Productive methods for wheat in Missouri. Missouri Agric. Exp. Sta. Bull. 188. 40 p., 8 fig. 1921.—Varieties and culture of wheat are discussed on the basis of station and outlying experiments since 1905.—*L. J. Stadler.*

5337. HENDERSON, G. S. Report of the Imperial agriculturist. Sci. Rept. Agric. Res. Inst. Pusa 1921-22: 68-78. 2 pl. 1922.—The report summarizes operations on the Pusa farm; field experiment work; trials of farm machinery; milk production; and the work of selection of the cross-bred dairy herd.—*Winfield Dudgeon.*

5338. HEUSER, OTTO. Versuche über die Standweite der Zuckerrüben. [Experiments in spacing sugar beet plants.] Illus. Landw. Zeitg. 43: 85. 1923.—The results of experiments on different soil types are reported.—*John W. Roberts.*

5339. HEUSER, OTTO. Zur Technik des Zuckerrübenbaues. [On the technique of sugar-beet culture.] Illus. Landw. Zeitg. 42: 411-413. 1922.—This is a popular article on the growing of sugar-beets.—*John W. Roberts.*

5340. HOLMGAARD, J. Bestemmelse af Kornprøvers Sortsrenhed ved Undersøgelse i Laboratoriet. [Determination in the laboratory of varietal purity of grain samples.] Nordisk Jordbrugsforskning 1922: 361-364. 1 col. pl. 1922.—At the state seed testing station it is possible to recognize 2-rowed and 6-rowed barley seeds and the common *erectum* and *nutans* varieties. Wheat and rye varieties can be determined in few cases only in the laboratory. In oats the color varies widely with growth and storage conditions, and determination of varieties in the laboratory is hardly possible. Only "Lyngby Hede Havre" may be determined after germination by the color of the first leaf,—grey-violet in light and violet in the dark.—*Ernst Gram.*

5341. HOWARD, A., AND G. L. C. HOWARD. Report of the Imperial economic botanists. Sci. Rept. Agric. Res. Inst. Pusa 1920-21: 8-20. 2 pl. 1921.—An attempt to solve the problem of production and distribution of improved varieties of wheat among small cultivators has been made in the United Provinces by cooperating with interested estate holders, certain government agencies, and cooperative movements. The number of private seed farms has increased rapidly. Pusa 4, a stiff straw variety of wheat, has yielded 40 $\frac{3}{4}$ maunds (about 1500 kgm.) per acre under estate conditions. Quick maturing wheats are a necessity in the Plains wheat area; if planted while the ground is too warm in the autumn, white ants destroy the seedlings, and varieties that mature too late in the spring are injured by the advent of the hot dry season. Work is in progress to develop desirable bearded varieties.—Testing and distributing improved varieties of tobacco, *Hibiscus cannabinus*, *H. sabdariffa*, *Cicer arietinum*, *Linum usitatissimum*, and *Carthamus tinctorius* have been carried on. The commercial value of the oil from *Carthamus tinctorius* seed is under investigation.—The deleterious action of grass growing under fruit trees, and the problem of soil aeration are being studied. During the monsoon *Medicago sativa* (lucerne) usually dies from wilt due to poor aeration of the roots, as a result of consolidation of the surface soil. It can be kept healthy by growing on flat raised beds about 1 m. broad, with irrigation trenches between.—*Winfield Dudgeon.*

5342. HOWARD, A., AND G. L. C. HOWARD. Report of the Imperial economic botanists. Sci. Rept. Agric. Res. Inst. Pusa 1921-22: 9-23. 1922.—Over 1,000,000 acres of Pusa wheats are now grown in the United Provinces and the Punjab. Pusa No. 4 and No. 12 wheats show good milling qualities. Bearded wheats developed to resist wild animals and birds give slightly higher yields than Pusa No. 12.—Development and distribution of improved varieties of tobacco, *Hibiscus cannabinus*, *Linum usitatissimum*, *Carthamus tinctorius*, and *Cicer arietinum* have continued, and work is begun on Indian barleys.—Work on soil aeration continues. The cotton plant is very sensitive to poor aeration, and has been found useful for experimental work. To investigate the action of grass on fruit trees, an orchard of 8 locally grown fruit trees was set out in 1914-16. It was divided into 3 parts: 1 under clean cultivation; 1 under complete grass; and 1 under grass, with aerating trenches filled with broken bricks. "The amount of carbon dioxide (in the soil atmosphere) was greatest in the grassed plot, least in the cultivated, and intermediate in the trenched plot. During the rains, the proportion of carbon dioxide rose considerably, particularly in the plots under grass." Root development in *Andropogon sorghum*, *Cajanus indicus*, and *Crotalaria juncea* is being studied in relation to agricultural practice. *Medicago sativa* (lucerne) grown on raised beds with irrigation trenches between does not die out during the monsoon; a crop sown October 20, 1921, has given 8 cuts up to July 11, 1922, yielding at the rate of 70,000 pounds green weight per acre. Lucerne does not set seed readily at Pusa.—Lathyrism, a disease "supposed to be due to long continued consumption of the seed of *Lathyrus sativus*," is being studied. No traces of alkaloid were found in the seed, but alkaloids were found in the seed of *Vicia sativa* a common weed of *Lathyrus* fields. Pollination, unit species, and relation of root development to disease resistance are also being studied in *Lathyrus*.—*Winfield Dudgeon.*

5343. HYSLOP, G. R. **Field peas.** Oregon Agric. Exp. Sta. Circ. 34. 2 p. 1923.—This crop does best in a cool season. Applications of land-plaster and sulphur give good results. Where garden peas or vetch have preceded field peas inoculation is not necessary. Where they are a new crop it is best to inoculate the seed. Early planting is desirable.—Standard varieties for high altitudes and dry-land districts are Kaiser, Bangalia, and Carlton. For that section west of the Cascade Mountains good varieties are White Canadian, Blue Prussian, and Arthur. Seeding should be at the rate of 90–120 pounds per acre. When planted with grain 90 pounds of peas should be used to $1\frac{1}{4}$ – $1\frac{1}{2}$ bushels of grain. Under dry-farm conditions peas are planted in double rows about 3 feet apart.—C. E. Owens.

5344. JACK, H. W., AND W. N. SANDS. **Cotton experiments in Malaya.** Malayan Agric. Jour 10: 248–258. 1922.—As a result of experiments during 2 seasons with several varieties of Egyptian and Sea Island Cotton it is shown that long staple cotton of good average quality can be grown in Malaya with a fair degree of success, as compared with the average of other countries, provided that its cultivation and the time of its sowing are given adequate attention and that pest control is systematized. The cotton-stainer (*Dysdercus cingulatus*) feeds on the seeds of other cultivated plants besides cotton, including Kapok, Roselle, and Hibiscus, and these would have to be destroyed or the pests on them controlled in cotton-growing localities. In the authors' opinion the eastern and northern states of the Peninsula offer the best prospects on account of their more defined wet and dry seasons and their lighter soils.—R. E. Holttum.

5345. JACOBSEN, L. P. **Forsøg med forskellig Afvanding og Sandbelægning paa Høgmose.** 1912–1921. [Experiments with ditching and drainage on peat soil. 1912–1921.] Tidsskr. Planteavl 29: 29–55. 1923.—Results of experiments on the influence of the distance between drainage ditches on yields are reported. The necessity of using layers of sand on soil is explained.—Albert A. Hansen.

5346. JOHNSEN, J. **Jordbundens Indflydelse paa Rødbedernes Stamme-Egenskaber.** [The influence of soil on the strain characteristics of red beets.] Gartner-Tidende [Copenhagen] 39: 151. 1923.—In 1922, 2 strains of red beets, grown for 2 generations on different soil types, were grown for comparison. The seed of one originated from a good, rich soil where the plants developed well, while the other came from a lighter soil where the growth was irregular and the form of the roots inferior. Bad form and color was finally less prominent in the 2nd, though it had more beets with broadly seated leaves and a higher leaf percentage. It is suggested that where beets were grown on poor soil the poor qualities have been apparent to a larger extent and therefore they have been discarded in sorting.—Ernst Gram.

5347. JONES, ROY C. **Oats and vetch versus corn or sunflowers for silage.** Oregon Agric. Exp. Sta. Bull. 194. 20 p., 2 fig. 1922.—As measured by milk yield there is little difference in feeding value of the 3 kinds of silage. Over a series of years sunflower has yielded the largest tonnage, with oats and vetch 2nd, and corn 3rd. During certain favorable seasons, oats-and-vetch gave the highest tonnage. Oats-and-vetch have certain advantages, however, among which are: (1) yield more on heavier, poorly drained soils; (2) fill silo in early summer and keep it from drying out and collapsing; (3) placed in silo in spring and used during summer allows double use of silo, as it can be filled again in fall with corn or sunflowers; (4) require no cultivation; (5) vetch benefits the soil.—C. E. Owens.

5348. KNIERIENE, W. VON. **Die starke Stickstoffdüngung der Wiesen als Mittel zur Gewinnung eiweissreichen Futters.** [Heavy application of nitrogenous fertilizers to meadows for securing protein-rich fodder.] Mitteil. Deutsch. Landw. Ges. 38: 384–386. 1923.—Sections of a meadow were fertilized with urea, others with minerals and urea, or with minerals alone; some were left unfertilized. The yields from those receiving complete fertilizers were much greater than from the others and the protein content of the hay was also higher.—A. J. Pieters.

5349. KORFF, ADOLPH. Ueber Queckenvertilgung. [Concerning the extermination of quack grass (*Agropyron repens*).] Illus. Landw. Zeitg. 43: 109. 1923.—The planting of crops which shade the ground most is particularly recommended as a means of extermination.—*John W. Roberts*.

5350. KUIJPER, J. Bibit voor orienteerende varieteiten proeven. [Bibit (cuttings) for varietal experiments.] Arch. Suikerindust. Nederland. Indie 30: 855-867. 1922.—New sugar cane varieties obtainable by planters after December, 1922, for testing under field conditions are listed as follows: 2801 P. O. J. (= 2722×2764 , = $[2364 \times \text{EK } 28] \times [\text{K} \times \text{EK } 2]$); 2802 P. O. J. (= $2364 \times \text{Tjoek. } 154$); 2803 P. O. J. (= 2703×2713 , = $[2354 \times \text{EK } 28] \times [2364 \times 2571]$); 2804 P. O. J. (= 2721×2751 , = $[2364 \times \text{EK } 28] \times [2364 \times 920]$); 2805 P. O. J. (= $2725 \times 247 \text{ B}$, = $[2364 \times \text{EK } 28] \times 347 \text{ B}$); 2806 P. O. J. (= $1547 \times 247 \text{ B}$, = $[213 \times 369] \times 247 \text{ B}$) These varieties are only a few years old and require thorough testing. All are practically immune to sereh and yellow-stripe disease; only 2806 occasionally shows a few stripe-disease plants.—Gumming disease has not yet been observed among them.—*Peter J. Klaphaak*.

5351. LARSEN, J. C. Dyrkningsforsög med Havresorter. 1915-1920. [Experiments with oats. 1915-1920.] Tidsskr. Planteavl 29: 56-94. 1923.—Yields of white, grey, and heather oats on newly reclaimed peat soil are compared with yields on other types of soils in other regions.—*Albert A. Hansen*.

5352. LARSEN, L. J. Kartoffelavl i aeldre Tid og nu. [Potato growing in former days and now.] Jydsk Landbrug 5: 242-244. 1923.—Thirty years ago the potato crop in central Jutland was 4-5 tons per hectare. The potatoes were grown after fallow, manured slightly, cultivated poorly, and not kept free of weeds. At present 25-30 loads barnyard manure, 200 kgm. 18 per cent superphosphate, 150 kgm. potassium salt, and 150 kgm. Norway saltpeter are applied, the potatoes are cultivated, kept free from weeds, and healthy seed potatoes used. In 1922 the average output of 12 fields of the variety Richters Imperator was 34 tons per hectare, and the average of 17 fields of Up-to-Date 35 tons per hectare.—*Ernst Gram*.

5353. LINDHARD, E. Dyrkningsforsög med Sukkerroestammer. 1922. [Experiments with sugar beets. 1922.] Tidsskr. Planteavl 29: 95-115. 1923.—The experiments give results of trials at the Government experiment stations of Danish strains of sugar beets supplied by Danish seed firms; the yields are compared with those of strains supplied by Swedish and German sugar factories. In general, the majority of the Danish strains yield slightly more root with a slightly smaller percentage of sugar than the so-called standard strains.—*Albert A. Hansen*.

5354. MCCALL, J. STEWART. A handbook on cotton and tobacco cultivation in Nyasaland. A guide to prospective settlers. 85 p. Government Printer: Zomba, Nyasaland, 1920.—Cotton cultivation. P. 1-62. Designed for prospective settlers, information is given concerning the environmental needs of cotton, establishing a cotton farm, varieties and selection, cultural and field methods, harvesting and marketing practices, pests and their control, and cotton legislation.—*H. M. Steece*. Tobacco cultivation. p. 64-78. This part contains a brief discussion of history of tobacco culture in Nyasaland, climate of the region, soils used for tobacco, management of seed beds, transplanting, field management, harvesting and curing. The Virginia or flue-cured type of leaf is produced. Exports for fiscal year ending March 31, 1920, were 4,340,000 pounds. Tobacco soils vary from light sandy loams to stiff red clays and are poor in nitrogen, normal to slightly deficient in phosphoric acid and rich in potash. The most profitable yield of tobacco is 450-550 pounds per acre. The best quality is obtained from virgin or grass land. Only a limited supply of wood is available for curing tobacco and attention to re-afforestation will be necessary to place the tobacco industry on a permanent footing. [See also Bot. Absts. 12, Entry 5288.].—*W. W. Garner*.

5355. MASSEY, ENRIQUE MOLINA. Depósitos para conservación de papas. [Potato storage.] Bol. Ministerio Agric. Nacion [Argentina] 27: 274-279. 4 fig. 1922.—The construction of varying types of storage buildings and pits for potatoes is described.—*John A. Stevenson.*

5356. MILLIGAN, S., AND W. H. HARRISON. Report of the Director. Sci. Rept. Agric. Res. Inst. Pusa 1921-22: 1-8. 1922.—The report gives a brief summary of the scientific work of the sections of chemistry, botany, animal nutrition, bacteriology, mycology, entomology, and agriculture, and of the Imperial Dairy Expert and the Sugar Bureau.—*Winfield Dudgeon.*

5357. PACZKA, ALEJANDRO. El cultivo del tabaco en Tlapacoyan. [Tobacco culture in Tlapacoyan.] Rev. Agric. [Mexico] 6: 617-623. 6 fig. 1922.—Popular.—*John A. Stevenson.*

5358. PETZKE, EGÓN. La Fourcroya gigantea una planta textil. [Fourcroya gigantea, a fiber plant.] Bol. Ministerio Agric. Nacion [Argentina] 26: 403-407. 1921.—A botanical description of the plant is given. Methods of cultivation, harvesting, and preparation of the fiber are discussed with particular attention to the last point since considerable difficulty has been experienced in producing fiber in Argentina.—*John A. Stevenson.*

5359. REYNOLDS, MARK H., AND A. N. SHEPHERD. Farmers' experiment plots. Wheat and oat experiments, 1922. Agric. Gaz. New South Wales 34: 229-237. 2 fig. 1923.—Experiments were conducted upon a number of private farms. Wheat varieties Bomen, Waratah, and Warren scored high yields for the northwest district. Yields were not increased by the use of phosphates. Very little disease was in evidence.—*L. R. Waldron.*

5360. RUSSELL, E. J. A great American agricultural cyclopaedia. [Rev. of: BAILEY, L. H. (editor). Cyclopaedia of farm crops: a popular survey of crops and crop-making methods in the United States and Canada. xvi + 699 p., 25 pl., 907 fig. The Macmillan Co.: New York and London, 1922 (see Bot. Absts. 12, Entry 5290).] Nature 111: 140-141. 1923.

5361. RUSSELL, JOHN. Rothamsted and agricultural science. Nature 111: 465-470. 2 fig. 1923.—The remarkable development of British agriculture between 1843 and 1870 would have been impossible without artificial manures. On the heavy soil at Rothamsted a liberal use of phosphates gives best results, but potash is less effective. On the lighter soil of Woburn, potash is more effective and phosphates in a less degree. Experiments with artificial farmyard manure are being tried. Extensive studies of the bacteria, algae, fungi, and protozoa of the soil have been made. The application of statistical methods to the study of the factors and results is beginning to give results. Figure 2 shows the predictable variation in wheat yields on 5 Broadbalk fields. Weather and soil deterioration figure most prominently on the fields without potash and with no manure. A part of the weather effect, from about $\frac{1}{2}$ in field with barnyard manure, to about $\frac{1}{2}$ on that without potash, can be predicted from the rainfall.—*O. A. Stevens.*

5362. SAGAWÉ, D. Raubbau und Ertragswert der Landgüter in den Kriegsjahren. [Exploitation and yield of agricultural estates during the war years.] Landw. Jahrb. 58: 618-644. 1923.—A detailed study of the value of farm yields in Germany during 1913-1919 is reported.—*S. A. Waksman.*

5363. SAYER, WYNNE. Report of the Secretary, Sugar Bureau (India). Sci. Rept. Agric. Res. Inst. Pusa 1920-21: 85-90. 1921.—The Bureau has collected and disseminated information, given technical advice in sugar production, and conducted experimental work in the development of desirable varieties of cane.—*Winfield Dudgeon.*

5364. SCHLUMBERGER, O. Kartoffelkonservierung und Kartoffelbeizung. [The conserving of potatoes in storage and the treatment of potatoes with fungicides.] Illus. Landw. Zeitg. 42: 372-373. 1922.—Some of the literature on the subject is compiled.—*John W. Roberts.*

5365. SCHULTZ, E. F. *La grama elephante*. [Elephant grass.] Rev. Indust. y Agric. Tucuman 12: 39-45. 4 fig. 1921.—*Pennisetum purpureum*, a forage plant native of Africa which has given excellent results in some parts of the world, has been under trial in Tucuman. The seed germinates poorly and a stand can more readily be obtained from cuttings. The rainfall in Tucuman during the time the grass has been under trial has been above normal so that it has not been possible to ascertain its drought-resistant possibilities. The grass was eaten readily by stock and was not injured by trampling or close grazing. Because of its thick stems the grass is not suited for hay but it is thought that with proper handling it may make a good quality silage.—*John A. Stevenson*.

5366. SCHURIG, A. *Der Anbau des Hanfes*. [The culture of hemp.] Illus. Landw. Zeitg. 42: 387-388. 1922.—This popular article on the culture of hemp includes the choice of soils, varieties, fertilizers, manner and time of seeding and harvesting, and preparation of the soil for seeding.—*John W. Roberts*.

5367. SHEPHERD, A. N. *Crop rotation on the Murrumbidgee irrigation areas*. Agric. Gaz. New South Wales 34: 249-250. 1923.—A 3-year rotation designed principally for dairy-men is suggested as follows: green fodder, such as oats and vetches, the field to be grazed later; sorghum and vetches; and maize sown with cowpeas. Three fields are to be used.—*L. R. Waldron*.

5368. SÖRENSEN, HAKON. *Dyrkningsforsog med Sorter og Stammer af lave Marvaerter, 1919-1921*. [Experiments with varieties of peas, 1919-1921.] Tidsskr. Planteavl 28: 807-833. 1922.—The following varieties of peas were used: American Wonder, London Wonder, Record, Wonder of Witham, Coopers Market, Carter's Daisy, and Strategem.—*Albert A. Hansen*.

5369. TERRELL, GEORGE B. *Fifteenth annual report of the Commissioner of Agriculture of Texas*. 1-47. 1922.—In this report are incorporated the reports of: J. M. DEL CURTO, division of plant pathology and seeds; E. L. SCHOSTAG, division of orchard and nursery inspection; R. E. YANTIS, division of statistics; J. M. BURKETT, division of edible nuts; R. E. McDONALD, division of entomology; and E. W. COLE, bureau of markets. Statements regarding the divisions are added.—*Mary R. Burr*.

5370. THATCHER, L. E. *The status of the soybean crop in Ohio*. Monthly Bull. Ohio Agric. Exp. Sta. 8: 59-64. 1923.—The data presented are based on information gained from questionnaires sent to 300 soybean growers in the state. It is thought that at the present rate of increase the next decade will see soybeans rivaling oats for a place as the major crop in the State. Ito San is the most popular variety followed closely by Midwest. Manchu, Medium Green, Wilson, and Elton are also grown. Suggestions are given as to the relative merits of each variety for serving the needs of the Ohio farmers; also brief discussions are devoted to dates of seeding, methods, rate and manner of seeding and harvesting. A list of 61 varieties with protein and oil content is appended.—*R. C. Thomas*.

5371. TONNELIER, CARLOS R. *Instrucciones practicas para la cosecha de trigo, lino, cebada, centena, avena, y maiz*. [Practical instructions for harvesting wheat, flax, barley, rye, oats, and corn.] Bol. Ministerio Agric. Nacion [Argentina] 26: 408-426. 1921.—Popular.—*John A. Stevenson*.

5372. VALENTINE, MAX. *Tobacco for Victorians*. Seed beds for bright tobacco. Jour. Dept. Agric. Victoria 19: 722-726. 1921.—Recommendations are made regarding selection of sites for seed beds, most suitable soil, methods of preparing and sterilizing the soil, sowing the seed, covering the beds, and care of the seedlings. Because of uncertainty as to seasonal conditions several beds should be planted in different locations and on different dates, thus providing for varying soil-drainage and temperature requirements. Only freshly cleared land is used. The best soil is a deep, friable, light sandy loam. To destroy weed seeds, fungi, and soil insects the soil is sterilized by surface burning or by steaming. After seeding, a frame 6 inches high is placed around the bed and covered with cheese cloth.—*W. W. Garner*.

5373. VALLEJO, CARLOS. El cultivo de papas en los Estados Unidos. [Potato culture in the United States.] Bol. Ministerio Agric. Nacion [Argentina] 27: 280-307. 27 fig. 1922.—The cultivation of potatoes in the U. S. A., including cultivation, varieties, harvesting, storing and yields is discussed.—*John A. Stevenson.*

5374. VUILLET, F. La culture du coton égyptien dans l'Arizona. Rapport de mission aux États-Unis. [The culture of Egyptian cotton in Arizona. Report of the mission to the United States.] 84 p., 16 illus. Émile LaRose: Paris, 1922.—The report begins with the history of the introduction into the U. S. A. of Egyptian cotton, stating how a cooperative association was formed for its culture under irrigation, thus assuring the necessary water for irrigation and the drainage of the valley land. Roosevelt Reservoir, Granite Reef Dam, and Joint Head are described. Insect injury is noted together with methods of control. Tables show the annual production in the Salt River Valley and sale price of the cotton. In 1914 an association was formed known as the Arizona Pima Cotton Growers. The report closes with a commercial classification of the Pima variety.—*Grace M. Weston.*

5375. WARTH, F. J. Report of the Imperial Agricultural Chemist. Sci. Rept. Agric. Res. Inst. Pusa 1920-21: 21-27. 1922.—Methods of nitrogen determination have been tested. In investigations of enzyme content and action in sugar cane it is found that windrowing the cane under proper conditions increases the output of sugar. The ratio of oxygen to CO₂ in the soils has been determined and shows striking differences between the grassed and cultivated plots. The ratio for the latter was found to vary between 86 and 60, whilst in the grassed plots the corresponding figures were 63.6 and 8.3. Soils of the Institute farm have been examined and correlated as far as possible with crop production.—*Winfield Dudgeon.*

5376. WEBER, C. A. Der jährliche Saatgutbedarf Deutschlands zur Anlage und Verbesserung des landwirtschaftlich nutzbaren dauernden Grünlandes. [The annual seed requirements of Germany for laying down and improving agriculturally valuable grass lands.] Mitteil. Deutsch. Landw. Ges. 38: 272-274. 1923.—The author has made an estimate of these seed requirements for the more important meadow and pasture grasses and legumes, and presents the figures in a table and discusses their significance.—*A. J. Pieters.*

5377. WEIDNER. Die Entwicklung des Flachsbaues in Bayern. [The development of flax culture in Bavaria.] Illus. Landw. Zeitg. 42: 252-253. 1922.—This is an historical sketch of flax culture in Bavaria with statistical tables showing its development.—*John W. Roberts.*

5378. WEISS, F. Die Stickstoffdüngung der Luzerne und anderer Schmetterlingsblütler. [Nitrogen fertilization for alfalfa and other legumes.] Illus. Landw. Zeitg. 43: 117-118. 1923.—Experiments are reported which show beneficial results from the moderate use of nitrogenous fertilizers.—*John W. Roberts.*

5379. WIGGLESWORTH, A. The new era in flax. Jour. Textile Inst. 14: 109-117. 1923.—Since linen manufacture was introduced into Ireland by the Huguenots over 3 centuries ago, there had been, until 1914, a steady expansion in the volume of linen manufactured, and a corresponding increase in flax fiber. Russia became the chief source of supply. The exports of flax from Russia increased from 167,000 cwt. in 1749 to 4,379,000 cwt. in 1907. The production in Russia decreased from 1907 to 1914, due partly to decreased acreage, but more to decreasing yield per acre. In 1880 the average yield of flax fiber in Russia was about 400 pounds per acre, and just before the war it had fallen to about 270. Since the war the flax position in Russia has become still worse, and an early return to pre-war conditions seems impossible. An important new field for fiber flax production has been established at elevations of 7,000-9,000 feet in Kenya Colony, with 20,000 acres yielding flax fiber that has been thoroughly tested by the Belfast College of Technology and proved to be superior to Russian flax. Kenya is the first province in the world to appoint officially qualified flax officers to inspect and grade flax. The Linen Research Association of Belfast, Ireland, has conducted important studies on the physi-

cal properties of plant fibers, and has developed a strain of flax yielding 28 per cent more fiber than ordinary commercial fiber flax. The U. S. A. Department of Agriculture has also developed by plant breeding since 1909, the variety "Saginaw" which is more vigorous, more uniform, and in many characters superior to commercial fiber flax. Improvements are being made in machinery for harvesting, thrashing, and scutching flax. A better market must be developed for flax fiber, and to do this it is suggested that more high grade and well finished linen fabrics be produced commanding high prices and yielding a return for higher priced flax fiber.—*L. H. Dewey.*

5330. ZEQUEIRA, LUIS CUEVAS. La selección de la semilla en el cultivo del maíz. [Seed selection in the cultivation of corn.] *Rev. Agric. Puerto Rico* 64: 9-10. 1921.—The author emphasizes the importance of all possible care in seed selection in corn cultivation.—*John A. Stevenson.*

5331. ZEQUEIRA, LUIS CUEVAS. La selección de la semilla en el cultivo del maíz. La caja germinadora. [Seed selection in corn culture. The germinating box.] *Rev. Agric. Puerto Rico* 67: 17-19. 1921.—An apparatus for testing the germinating power of seed corn is described.—*John A. Stevenson.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

CARROLL W. DODGE, *Editor*

CHARLES A. WEATHERBY, *Assistant Editor*

(See also in this issue Entries 5361, 5374, 5377, 5424, 5435, 5448, 5461, 5510, 5644, 5697, 5799, 5812, 5866, 5884, 5892, 5898, 5903, 5921, 5926, 5957, 6007, 6019, 6067, 6076, 6116, 6124)

5332. ANONYMOUS. Current topics and events. *Nature* 111: 508. 1923.—Reference is made to Botanical Abstracts and the suggestion to publish Biological Abstracts in its stead. The writer agrees with Cockerell's preference for an analytical index such as the Zoological Record; but in view of the difficulties the latter publication has had, the feasibility seems doubtful.—*O. A. Stevens.*

5333. ANONYMOUS. Imperial College of Science and Technology. *Nature* 111: 295-296. 2 fig. 1923.—This is a general account of the history and work of the Department of Botany (Plant Technology) of the College, with exterior and interior views of its new building in London.—*O. A. Stevens.*

5334. ANONYMOUS. Prof. Dr. Kamiel Vermoesen. *Natuurw. Tijdschr.* 4: 248. 1922.—Kamiel Vermoesen died December 17, 1922. He was plant physiologist at the University of Louvain, and a specialist on the flora of the Congo. In relation to modern views of crystallography, he studied pollen grains of different groups of plants, investigations which were unfinished at his death.—*J. C. Th. Uphof.*

5335. ANONYMOUS. Professor Emile Perrot. *Amer. Druggist and Pharm. Rec.* 70: 22-23. 3 fig. 1922.—This is a brief account of the achievements of this versatile worker as student, professor of materia medica, and investigator of medicinal and economic plants of Europe and Africa.—*C. M. Sterling.*

5336. ANONYMOUS. Une religieuse naturaliste,—Feu Soeur Marie-de-Sainte-Amélie. [A nun naturalist—the late Sister Marie-de-Sainte-Amélie.] *Nat. Canadien* 48: 265-267. 1922.—The Rev. Sister belonged to the Convent of the Holy Cross of Saint-Laurent, near Montreal, and died Feb. 17, aged 71 years. Her herbarium, which won prizes at both Montreal and Chicago, contained 1,800 plants mounted and scientifically classified in 20 volumes. From 1890 to 1922 she had charge of the "Annales" and the "Bulletin" of the Museum at Saint-Laurent.—*A. H. MacKay.*

5387. ANONYMOUS. [Rev. of: DAWSON, W. H. (editor). *The Yearbook of the Universities of the Empire, 1923*. Published for the Universities Bureau of the British Empire. xii + 692 p. G. Bell and Sons: London, 1923.] *Nature* 111: 459. 1923.

5388. ANONYMOUS. *A yearbook of the learned world*. [Rev. of: *Index Generalis: Annuaire général des universités, grandes écoles, académies, archives, bibliothèques, instituts scientifiques, jardins botaniques et zoologiques, musées, observatoires, sociétés savantes*. (General index of universities, scientific institutes, museums, learned societies, etc.) Published under the direction of R. DE MONTESSUS. 2111 p. Gauthier-Villars et Cie: Paris, 1923 (see Bot. Absts. 11, Entry 2239).] *Nature* 111: 425-426. 1923.—The reviewer regards the execution of the work as excellent, but finds a considerable number of omissions and errors in entries relating to the British Empire. He suggests that the editor might better have used the Yearbook issued by the Universities Bureau as a basis instead of depending upon the replies to his questionnaires received from the different institutions.—O. A. Stevens.

5389. ANONYMOUS. *Scientific societies in the British Isles*. [Rev. of: *The year book of the scientific and learned societies of Great Britain and Ireland: a record of the work done in science, literature, and art during the session 1921-22 by numerous societies and government institutions*. 39th annual issue. vii + 374 p. C. Griffin and Co.: London, 1922 (see Bot. Absts. 12, Entry 2285).] *Nature* 111: 389. 1922.

5390. BULLOCK, SAMUEL DILMAN. *La granja Norteamericana y algunos aspectos de la vida rural*. [The North American farm and some aspects of country life.] Rev. *Facultad Agron. y Veterinaria Univ. Nacion. Buenos Aires* 4: 14-23. 1922.—This begins with a historical sketch of the farming industry in the U. S. A. as affected by colonial conditions and by later government policy in the distribution of public lands. Both influences tended to produce numerous independent farms of comparatively small area. Statistics of rural population, crops, and stock are given for the state of Wisconsin, and there is an account of agricultural organizations and of educational facilities and government aid available for the farmer.—C. A. Weatherby.

5391. CHEVALIER, A. *Octave Lignier, 1855-1916*. 19 p., 1 pl. Paris, 1920.—This is an account of the life of M. Lignier, professor of botany at the University of Caen, of his work as a teacher, and of his researches in the anatomy of plants, paleobotany, and evolutionary morphology.—C. A. Weatherby.

5392. CHRISTENSEN, C. *Otto Friederich Müller, specielt som Botaniker*. [Otto Friedrich Müller, especially as a botanist.] *Nat. Verden* 6: 49-68. *Portrait*. 1922.

5393. COCKERELL, T. D. A. *Sir Isaac Bayley Balfour*. *Nature* 111: 150. 1923.—*Prismula Rusbyi* Greene and *P. Ellisiae* Cockerell, occupying different mountain ranges in New Mexico, are so similar in appearance that a German writer pronounced them identical. The writer procured seed of *P. Ellisiae* for Prof. Balfour, who grew the plants at Edinburgh and demonstrated that the 2 species were distinct.—O. A. Stevens.

5394. COLON, E. D. *Breve reseña del desenvolvimiento de la agricultura en Puerto Rico*. [Brief résumé of the development of agriculture in Porto Rico.] *Rev. Agric. Puerto Rico* 8²: 49-53. 1922.—The author presents an outline of the various stages through which the agriculture of the Island has passed from the time of the aboriginal inhabitants to the end of the Spanish regime.—John A. Stevenson.

5395. COLON, E. D. *Instituciones relacionadas con la agricultura*. [Agricultural institutions.] *Rev. Agric. Puerto Rico* 9⁶: 7-11. 1922.—Agricultural experiment stations were founded by the Spanish government at Rio Piedras and Mayaguez, Porto Rico, in 1880 and continued until 1897. An outline of the experimental work carried on by these stations, covering all of the principal crops, is given.—John A. Stevenson.

5396. COLON, E. D. *Introducción de especies extranjeras*. [Introduction of exotic species.] *Rev. Agric. Puerto Rico* 9: 20-23. 1922.—The dates when the various economic plants were first brought to Porto Rico, together with the name of the importer, are given.—*John A. Stevenson*.

5397. DAVY DE VIRVILLE, A. D. *Gaston Bonnier*. *Nat. Canadien* 49: 222-223. 1923.—A biographical sketch is presented of the great botanist of France who died Dec. 30, 1922.—*A. H. MacKay*.

5398. DRUDE, OSCAR. *Bernhard Schorler*. *Sitzungsber u. Abhandl. Naturwiss. Ges. "Isis"* 1920-21: xiv-xvii. 1922.—An account is given of the botanical activities of Bernhard Schorler, who died Apr. 1, 1920. He was an ardent student of the vascular plants of Saxony and also of the cryptogams, his interests being both floristic and ecological. In 1905 he undertook a revision and expansion of Otto Wünsche's *Sächsische Excursionsflora*, the new work appearing under the title, *Die Pflanzen Sachsens*. The 11th edition of this publication, which is perhaps his most important contribution to botany, appeared in 1919.—*A. W. Evans*.

5399. DUDGEON, WINFIELD. *The Madras meeting of the Indian Botanical Society*. *Jour. Indian Bot.* 3: 22-25. 1922.—This is a brief account of the first scientific meeting of the Society at Madras in January, 1922. The program of 34 papers is given.—*Winfield Dudgeon*.

5400. [FYSON, P. F.] *Editorial*. *Jour. Indian Bot.* 3: 29. 1922.—The Journal of Indian Botany, started privately by P. F. Fyson and financed by T. R. D. Bell, late Chief Conservator of Forests, Bombay, has become the property and official organ of the Indian Botanical Society.—*Winfield Dudgeon*.

5401. [FYSON, P. F.] *Editorial note*. *Jour. Indian Bot. Soc.* 3⁶: 2nd cover page. 1923.—"The Journal of Indian Botany . . . will henceforth be styled the Journal of the Indian Botanical Society."—*Winfield Dudgeon*.

5402. HASUND, S. *Havren i Sagatids-Jordbruget*. [Oats in the agriculture of the saga age.] *Nordisk Jordbrugsforskning* 1922: 297-306. 1922.—In the sagas and tales from 900 to 1300, oats, now the principal grain in Norway, is not mentioned. But it was cultivated about the years 400 and 800, and very soon after 1300. When oats is not mentioned, as are "barley" and "grain," the reason is sought in (1) a growing of barley and oats in mixture, (2) an admitted computation of oats in units of barley flour.—*Ernst Gram*.

5403. HECKE, G. H. *G. Harold Powell: A tribute*. *Monthly Bull. California Dept. Agric.* 11¹⁰: 1 unnumbered p., 1 pl. 1922.

5404. HECKE, G. H. *John Charles Whitten: A tribute*. *Monthly Bull. California Dept. Agric.* 11¹⁰: 1 unnumbered p., 1 pl. 1922.

5405. KOFOID, CHARLES ATWOOD. *Pasteur and the science of biology*. *Sci. Monthly* 16: 658-662. 1923.—This is an appreciation of Pasteur and his work.—*L. Pace*.

5406. LANGE, A. *Nogle omdannede Plantenavne*. [Some transformed plant names.] *Nat. Verden* 6: 424-430. 1922.—Latin names have often been transformed into common names of somewhat similar sound, but frequently of quite different meaning. For example, *Semen foeni graeci* has passed through *Foenum graek*, *Freum graek*, *Fillegraek*, *Tillegraek*, *Tillegraf* to become "Telegraph seeds." *Levisticum* has in German many vulgar names composed of *Liebe*, *Laub*, *Lauf* and *Stock*, *Stickel*. The same thing has happened in Danish; the author lists 60 transformations of *Levisticum*.—*Ernst Gram*.

5407. LYMAN, G. R. Report of the fourteenth annual meeting of the American Phytopathological Society. *Phytopathology* 13: 188-198. 1923.—The report includes a general report of the sessions of the Society held in the buildings of the Massachusetts Institute of Technology, Cambridge, Massachusetts, Dec. 27-30, 1923; the report of the Treasurer for 1922; the report of the Editor-in-Chief of Phytopathology; report of the retiring representative on the Board of Control of Botanical Abstracts; action of the Society on the Union of American Biological Societies; a report of the Advisory Board; reports of various committees; report of a discussion of the proposed Tropical Institute of Phytopathology; and reports of other miscellaneous business.—*B. B. Higgins*.

5408. OYE, PAUL VAN. De oekonomische beteeknis der natuurwetenschappelijke onderzoekingen in Nederlandsch-Indie. [The economic significance of biological research in the Dutch East Indies.] *Natuurw. Tijdschr.* 4: 197-208. 1922.—The Dutch East Indies have been in possession of the Netherlands for 300 years. In early times no official attention was paid to biological subjects. Persons interested in them (e.g., medical men employed by rich private individuals) worked independently and usually with small means. But they gathered plant and animal material and contributed considerably to form a foundation for the study of the natural sciences. In this way originated Ambonsche Rariteitskamer, Hortus Malabaricus, and many other important works. Now experts regard the Dutch East Indies as an example of a colony well organized for biological and agricultural work. Mention is made of the botanical garden at Buitenzorg and of the Department of Agriculture of Java with its numerous branches, a system closely connected with the name of Melchior Treub.—*J. C. Th. Uphof*.

5409. PRAEGER, R. LLOYD. Henry William Lett. *Irish Nat.* 30: 41-43. 1921.—This Irish botanist was noted chiefly for his work among the bryophytes.—*W. E. Praeger*.

5410. RUSSELL, E. J., AND A. HENDERSON SMITH. Discovery of the use of phosphates as fertilizers. *Nature* 111: 116-117. 1923.—The idea of utilizing raw mineral phosphates as fertilizer is usually supposed to date from 1840. In May, 1837, however, an unnamed writer in the *Farmers' Magazine* (2d series) proposed making "fictitious bone dust by impregnating lime with phosphoric acid" and another (same date) stated that phosphate of lime, if available to the farmer, would be invaluable and that there were entire mountains of it in Spain.—*O. A. Stevens*.

5411. TIDESTROM, IVAR. The floral alphabet of the Celts. *Torreyia* 23: 41-49. 1 fig. 1923.—The names of the letters in the Celtic alphabet are all plant names. For example, A in Gaelic is *ailm*, which is also the word for "elm." These names are compared with their cognates in English, Anglo-Saxon, Old Norse, and Swedish.—*J. C. Nelson*.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 5290, 5383, 5423, 5428, 5435, 5440, 5606, 5918)

5412. CLUTE, WILLARD N. Botany for beginners-VI. *Amer. Bot.* 29: 53-57. 1923.

5413. CLUTE, WILLARD N. Plant names and their meanings-XV. *Scrophulariaceae*. *Amer. Bot.* 29: 60-67. 1923.

5414. DUDGEON, WINFIELD. [Rev. of: MOLISCH, HANS. *Mikrochemie der Pflanze*. [Microchemistry of plants.] 2nd ed., 434 p., 135 fig. Gustav Fischer: Jena, 1921 (see Bot. Absts. 12, Entry 5169).] *Jour. Indian Bot.* 3: 119. 1922.

5415. F[YSON], P. F. [Rev. of: FRITSCH, F. E., AND E. J. SALISBURY. *Botany for students of medicine and pharmacy*. 346 p., 163 fig. G. Bell and Sons: London, 1921.] *Jour. Indian Bot.* 3: 123-124. 1922. [See also *Bot. Absts.* 12, Entry 1009.]

5416. F[YSON], P. F. [Rev. of: JIVANNA RAO, P. S. *Lessons in water plants*. *Jour. Madras Agric. Students Union* 10: 20 p. 1922.] *Jour. Indian Bot.* 3: 121. 1922.

5417. F[YSON], P. F. [Rev. of: RANGACHARI, K. *Manual of elementary botany for India*. 2nd ed., 518 p., 471 fig. Government Press: Madras, 1921 (see *Bot. Absts.* 11, Entry 3454).] *Jour. Indian Bot.* 3: 124. 1922.

5418. F[YSON], P. F. [Rev. of: TANSLEY, A. G. *The elements of plant biology*. George Allen & Unwin: London, [1922] (see *Bot. Absts.* 12, Entry 3809).] *Jour. Indian Bot.* 3: 183-184. 1923.

5419. HUXLEY, JULIAN S. *Biology in schools*. *School Sci. Rev.* [London] 4: 5-11. 1922.—The function of biology in school curricula is shown. Interest in animals is more easily aroused than in plants, the main link between the inorganic and organic. Evolution is most easily taught in connection with organisms, especially the idea of direction in evolution. This leads to the relation of mind to matter, and shows that increased mental power is of immense importance in biological evolution.—*Elsie Hammond*.

5420. STRASBURGER, E., und MAX KOERNICKE. *Das botanische Practicum*. 7th ed., 883 p., 260 fig. (3 col.) Gustav Fischer: Jena, 1923.—In comparison with the 6th edition of 1921 this well known work is increased by 10 pages and 13 figures. Numerous changes have been made in the text. The chapter on *Saprolegnia* has been extended. More attention is given to the red algae. Citations of literature have been considerably increased. Register IV, p. 711-842, presenting a compact consideration of reagents, stains, etc., is printed on another color of paper to facilitate consultation.—*J. C. Th. Uphof*.

CYTOLOGY

GILBERT M. SMITH, *Editor*

(See also in this issue Entries 5598, 5624, 5629, 5635, 5742, 5764, 5768, 5809, 5922, 5952, 5954)

5421. ARGAUD, R. *Sur la présence intra-nucléolaire du centrosomé*. [On the existence of an intra-nucleolar centrosome.] *Compt. Rend. Acad. Sci. Paris* 174: 1078-1080. 2 fig. 1922.—This peculiar condition is found in certain cells of man.—*C. H. Farr*.

5422. BECQUEREL, PAUL. *Observations sur la nécrobiose du protoplasme végétal avec l'aide d'un nouveau réactif vital*. [Observations on the necrobiosis of vegetable protoplasm with the aid of a new intravital reagent.] *Compt. Rend. Acad. Sci. Paris* 176: 601-603. 1923.—The basic aniline dyes are used as intravital stains. They are absorbed by the vacuole, but do not enter the cytoplasm and nucleus while the cell is alive. Necrobiosis is the name given to the change of protoplasm from the living to the dead condition. Scale leaves of bulbs of *Allium cepa* were treated with a mixture of 2 parts of methylene blue with 1 part of Bismarck brown and one part of neutral red and remained alive in this solution for as long as 24 hours. During this time the plasma membrane is green, the protoplasm a pale yellow, the vacuoles a rose brown, and the spheric microsomes a translucent green. The parietal cytoplasm is readily seen to circulate. It is thus apparent that the methylene blue does not stain the cell while it is alive. However, when death occurs the nucleus becomes green with a tint of brown and the 2 nucleoli become blue. The cytoplasm takes on a greenish blue tint, and the vacuole seems to disappear. Observations with the microscope and ultramicroscope indicate that necrobiosis is always accompanied by an irreversible colloidal transformation of the funda-

mental substance of the cytoplasm and nucleoplasm. This is a change from a homogeneous gel to a heterogeneous granular gel more or less vacuolate and reticular. This is perhaps due to a change in the nature of the electrical charges of the molecules of the cytoplasm which are negative in life and positive in death. This is indicated by the fact that they absorb in the latter state the negative molecules of methylene blue.—*C. H. Farr.*

5423. CAROTHERS, E. ELEANOR. *The cell mechanism.* [Rev. of: SHARP, LESTER W. *Introduction to cytology.* McGraw-Hill Book Co.: New York, 1921.] *Jour. Heredity* 12: 351-353. 1921.—That cytology is "one of the most actively developing biological sciences is indicated by the appearance in little more than a year of three new textbooks on the subject, two from England and the American one which is the subject of this review." The reviewer considers Sharp's book "well planned and modern in its view-point," naming its bibliographies, efficient index, and text-figures among other good points. Lack of clearness and accuracy are noted in some places, but the "book seems adapted to meet the needs of several classes of people" and "especially useful since it stresses the views of the botanists and makes their results more readily accessible." [See also *Bot. Absts.* 11, Entries 230, 2476, 3448; 12, Entry 5428.]—*Oliver Olson.*

5424. CHESHIRE, FREDERICK J. *The early history of the polariscope, and the polarizing microscope.* [Presidential address, Royal Microscopical Society, London, read January 17, 1923.] *Jour. Roy. Microsc. Soc. London* 1923: 1-8. 8 fig. 1923.—The paper refers briefly to the use of the polarizing microscope in the examination of biological material.—*R. E. Cleland.*

5425. CONN, H. J., S. I. KORNHAUSER, THOMAS MALLORY, F. G. NOVY, AND L. W. SHARP. *American eosins.* *Science* 56: 689-690. 1922.—This brief report of the Commission on Standardization of Biological Stains explains the differences in chemical composition of the several eosins on the market. As compared with the Grüber eosins, the American samples tested proved to be better in almost every case.—*C. J. Lyon.*

5426. DANGEARD, PIERRE. *Le vacuome dans les graines de pollen des Gymnospermes.* [The vacuome of the pollen grains of gymnosperms.] *Compt. Rend. Acad. Sci. Paris* 176: 915-917. Fig. 1-5. 1923.—A study is reported of the development and germination of the pollen grains of *Taxus baccata*, *Cephalotaxus Fortunei*, and some of the Cupressineae by means of intravital stains.—*C. H. Farr.*

5427. DENHAM, H. J. *A micrometric slide rule.* *Jour. Roy. Microsc. Soc. London* 1923: 57-61. 2 fig. 1923.—A simple device is described by which large numbers of microscopical measurements at different magnifications can be quickly made.—*R. E. Cleland.*

5428. DUDGEON, WINFIELD. [Rev. of: SHARP, LESTER W. *An introduction to cytology.* xiii + 452 p., 159 fig. McGraw-Hill Book Co.: New York and London, 1921.] *Jour. Indian Bot.* 3: 119. 1922. [See also *Bot. Absts.* 11, Entries 230, 2476, 3448; 12, Entry 5423.]

5429. FARR, CLIFFORD H. *Quadripartition by furrowing in Sisyrinchium.* *Bull. Torrey Bot. Club* 49: 51-61. Pl. 2. 1922.—A summary is given of recent work done on quadripartition of pollen-mother-cells in various dicotyledons. In *Sisyrinchium Bushii* Bicknell much the same manner of quadripartition was found.—*P. A. Munz.*

5430. GELEI, J. *Weitere Studien über die Oogenese des Dendrocoelum lacteum. III. Die Konjugationsfrage der Chromosomen in der Literatur und meine Befunde.* [Further studies on oogenesis in Dendrocoelum lacteum. III. The question of chromosome conjugation in the literature and my investigations.] *Arch. Zellf.* 16: 299-370. 1 fig. 1922.—The author continues his studies upon *Dendrocoelum lacteum* with a discussion of the subject of chromosome conjugation. He first reviews the terminology adopted previously by him:

presynopsis referring to the early heterotypic prophase before synapsis or syneesis; syndesis including the remaining stages up to the first metaphase, in turn subdivided into eusyndesis (diplotene, strepsinema), and chalasthosyndesis (diakinesis). The results of his studies are fully discussed, with their bearing upon the work of other authors. The first oocyte division is the reduction division. This is preceded by a distinct resting stage. In early prophase the chromosomes become distinct as long threads, which are clearly single in structure. No evidence is found of parallelism or an approximation of threads during this stage, or of a split in the chromosomes during the previous telophase. Following early prophase, the ends of the threads become associated closely at one side of the nucleus, forming more or less radiating loops—the “bouquet” (Schleifenbukett). The number of loops is greater than the haploid of chromosomes. The threads are distinctly and regularly beaded. The conjugation of chromosomes follows. There is no question but that this is a longitudinal fusion of whole chromosomes. Conjugation is brought about by the fusion of the leptotene loops of the “bouquet” in pairs, fusion beginning at the “pole” end, where the thread ends approximated, and proceeding to the distal end of the loops. The conjugated or diplotene thread is thicker than the leptotene. Conjugation is an intimate fusion of threads, not merely an approximation. “By longitudinal conjugation of chromosomes we mean the fusion, beginning at the end, of two homologous chromosomes, one descended from the male, the other from the female parent, in such a way that the qualitatively equal parts of the conjugants always fuse. * * * it makes possible not only the reduction in number of the chromosomes, but also the mixing of their contents, and their reconstruction.” Early in the conjugation period, crossing over may take place.—In the more purely theoretical part of the paper the question is asked as to whether there is any sex difference between the chromosomes of the 2 sexes, and the author concludes that there is none. If 2 sperms or 2 eggs could be made to fuse and develop, an entirely normal individual would be produced. The phylogenetic history of chromosome conjugation is discussed. Cell fusion is a necessary forerunner of chromosome conjugation, which in turn is essential to chromosome reduction. In evolution, therefore, the original cells were haploid and these in time began to fuse. Chromosome conjugation followed, at first in an end to end fashion, and finally longitudinally, and the reduction in number of chromosomes appeared last of all. A discussion of the meaning of the “bouquet” follows, the conclusion being that this arrangement is for the purpose of bringing together the homologous chromosomes in such a way that they can conjugate. A good bibliography follows.—*Ralph E. Cleland.*

5431. GILLIS, J. Is het mogelijk dat een enkelvoudige zetmeelkorrel twee “navels” zou bezitten? [Can a simple starch grain possess two “navels”?] *Natuurw. Tijdschr.* 4: 162-166. 5 fig. 1922.—In studying the optical properties of the starch grain in polarized light, the starch layers are compared with concentric spheres of which the navel, or “nucleus,” is the geometrical center. According to Reychler the concentric layers are formed in circles round the longest axis, consequently are conaxial. The writer states the starch grain contains either 1 navel or that there are at the ends of the axis “polar points.” The simple starch grains are entirely surrounded by the substance of the starch, in which form the concentric or excentric layers, and contains but 1 “nucleus.”—*J. C. Th. Uphof.*

5432. HERRERA, A. L. Sur l'imitation des plasmodies et des structures chromatiques avec le silicate de sodium noirci par le noir l'ivoire et des gouttes d'alcool en diffusion. [On the imitation of plasmodia and chromatic structures by diffusing drops of alcohol through sodium silicate blackened with ivory back.] *Compt. Rend. Acad. Sci. Paris* 176: 1011-1012. 1923.—By this means it is possible to imitate plasmodia, cells, nuclei, and chromatin structures. Plasmodia show a movement of short duration, also a tendency to contract. Nuclei with chromosomes may be simulated by using the alkaline silicate. The structures undergo a sort of karyolyse.—*C. H. Farr.*

5433. HOBGEN, LANCELOT. The problem of synapsis. *Jour. Roy. Microsc. Soc. London* 1920: 269-276. 1920.—There is no justification for the assumption that there is any difference between the paternal and maternal moieties contributed to the zygote in relation to the

specific and generic characters of the organism, or between the role of cytoplasm and nucleus in the same regard. The claim that chondriosomes transmit "non-mendelian" characters is ill founded. It is necessary, in connection with the chromosome theory of character transmission, to demonstrate that the "reduction" segregates chromosome pairs into maternal and paternal components, and further that the chromosomes of one generation correspond to those of another. The continuity, numerical constancy, morphological constancy and behavior in hybrids indicate the correctness of these assumptions. The behavior of the accessory chromosome also bears on this point. The parasynaptic and telosynaptic views bear on the mechanism of synapsis, but the latter view has scant direct observational evidence. The study of individual chromosomes and the re-study of reported telosynaptic cases have often tended to favor the parasynaptic view. The situations in plants and animals have been confused. Among the questions that arise are: (1) is there evidence that the chromatin elements conjugate? (2) are such elements really chromosomes? (3) are these subsequently disjoined? "It will thus be seen that while the chromosome hypothesis has proved a great incentive to research—particularly in the problem of sex—its major premise, the reality of synapsis, is in no way firmly established; further knowledge of the relation of chromosomes to the organization of the resting nuclei and a specialized study of individual heterotype chromosomes constitute, therefore, two of the most imperative needs of cytological theory today."—*Wm. Randolph Taylor.*

5434. LOEWENTHAL, HANS. Die Oogenese von *Tubifex tubifex* (Müll.). (Zur Kritik der "Kernverschmelzung" Oschmanns.) [Oogenesis in *Tubifex tubifex*. In criticism of the "nuclear fusions" of Oschmann] Arch. Zellf. 16: 231-237. Pl. 14. 1922.—The author discusses a paper of Oschmann (1914) in which the latter describes in *Tubifex bavaricus* a process by which the egg is formed through a fusion of many oocytes and their nuclei. Such a process would compel a revision of our ideas concerning the constancy of chromosome number and individuality. Oschmann states (1919) that there are here "no cell organs, neither chromosomes, nucleolus, centrospheres, centrosomes, centrioles, etc., nor nucleus and cytoplasm." The author shows that in *T. tubifex*, while the central oocytes, which act in a nourishing capacity, degenerate, and their nuclei fuse, the peripheral oocytes of the complex do not fuse, but give rise individually to eggs. The results given in this paper therefore tend to discredit the cytological ideas of Oschmann above mentioned.—*Ralph E. Cleland.*

5435. LUNDEGÅRDH, HENRIK. Zelle und Cytoplasma. [Cell and cytoplasm.] In: *Handbuch der Pflanzenanatomie*. Edited by K. LINSBAUER. I Abt., 1 Teil: Cytologie, Band 1. xii + 402 p., 195 fig. Borntraeger: Berlin, 1922.—This is a comprehensive review of our knowledge of the plant cell as regards its general features and its behavior in the formation of tissues, together with a detailed discussion of cytoplasm and cytoplasmic structures other than plastids, which are to be treated in a separate volume of the series.—The contents of the work may be briefly indicated as follows: The introduction consists of an account of the historical development of cytology and plant anatomy. The 1st principal section, The Cell, comprises 11 chapters dealing with the following main topics: nomenclature; the morphological organization of the cell (including brief mention of the nucleus and its division, treated fully in the volume by Tischler [see Bot. Absts. 12, Entry 5448]; symmetry, size and form of the cell; protoplasmic connections and cell fusions; the role of the cell in tissue formation and the possible causes underlying this process; types of cell aggregates; tissues and tissue systems; the physical and chemical organization of the cell, including a discussion of theories of elementary structure. In the 2nd section, The Cytoplasm, there are 10 chapters dealing with nomenclature and methods, the form of the cytoplasmic body, the structure of cytoplasm, consistency and degeneration phenomena, alloplasmatic structures (chiefly the achromatic figure), cytosomes (chondriosomes), the Hautschicht, vacuoles, cilia, and cytoplasmic movement.—The book has a very extensive bibliography, and is supplied with author and subject indexes.—*L. W. Sharp.*

5436. MARKOVITS, EMMERICH. Zytologische Veränderungen von *Paramaecium* nach Bestrahlung mit Mesothorium. [Cytological changes effected in *Paramaecium* through treatment with mesothorium (radium bromide).] Arch. Zellf. 16: 238-248. Fig. 1-2, A-D. 1922.—The author subjected individuals of pure lines of *Paramaecium caudatum* to the emanations from 10 mgm. of radium bromide, the alpha rays being eliminated and the beta and gamma rays being allowed to act. This resulted in a decrease in size and a generally increased rate of division in animals having recently undergone endomixis, but resulted in the death of those approaching or undergoing this reorganization. Cytological examination showed the division of the macronucleus to be unusually early, as well as abnormal in other ways, but the micronucleus remained seemingly unaffected.—Ralph E. Cleland.

5437. MIRANDE, MARCEL. Sur les organites élaborateurs particuliers (stérinoplastes) de l'épidermis des écailles de bulbes de lis blanc. [On the special elaborating organs, the sterinoplasts, in the epidermis of the scales of the bulbs of the white lily.] Compt. Rend. Acad. Sci. Paris 176: 327-330. Fig. 1-21. 1923.—More or less spherical structures, composed of a central body surrounded by an outer layer or mantel, are found in these cells. They may give rise to a number of lobes, called calculs, which may have a crystalline structure. By boiling, the whole mass may become crystalline. Examination by means of intravital stains, boiling, and various chemicals shows that they are both protein and lipid in composition.—C. H. Farr.

5438. MIRANDE, MARCEL. Sur la nature protéolipoidique des stérinoplastes du lis blanc. [On the proteolipoidic nature of the sterinoplasts of the white lily.] Compt. Rend. Acad. Sci. Paris 176: 596-598. 1923.—The central body of the sterinoplast is found to be of lipid composition. The covering is composed of an external layer of protein, an internal thicker layer of alternating concentric striae of protein and lipid substances; next to the central body is a thin pellicule of proteolipoid material.—C. H. Farr.

5439. MIRANDE, MARCEL. Sur la nature de la sécrétion des stérinoplastes du lis blanc. [On the nature of the secretion of the sterinoplasts of the white lily.] Compt. Rend. Acad. Sci. Paris 176: 769-771. 1923.—The chemical nature of the central body of the sterinoplast is further studied. It is now found to be composed of the lipid, phytosterine. Various reactions of this substance, especially with heat, are discussed.—C. H. Farr.

5440. NIERENSTEIN, M. Tinctorial chemistry and histology. [Rev. of: BECHER, SIEGFRIED. Untersuchungen über Echtfärbung der Zellkerne mit künstlichen Beizenfarbstoffen und die Theorie des histologischen Färbeprozesses mit gelösten Lacken. (Investigations on nuclear stains and the theory of staining.) xx+318 p. Gebrüder Borntraeger: Berlin, 1921.] Nature 110: 33. 1922.—The book is "certainly the best of its kind so far published."—O. A. Stevens.

5441. NOEL, R. Sur des phénomènes de condensation de corps gras à la surface des mitochondries. [On the phenomenon of the condensation of fat bodies on the surface of mitochondria.] Compt. Rend. Acad. Sci. Paris 174: 572-573. 1922.—The material used was the liver of the white mouse. Figures are given in addition to the description, and there is an attempt to explain the phenomenon on the basis of colloids.—C. H. Farr.

5442. OVEREEM, CASPER VAN. Über Formen mit abweichender Chromosomenzahl bei *Oenothera*. [Forms with varying chromosome numbers in *Oenothera*.] Beih. Bot. Centralbl. 1 Abt. 39: 1-80. Pl. 1-15. 1922.—A bibliography of 564 citations on the *Oenothera biennis* group, classified as to anatomy, cytology, systematic botany, etc., is given.—The relation between habit and chromosome number is discussed in triploid, lata, gigas, and forms developed from crosses. A particular form always has a definite number of chromosomes.—The origin of new elementary species in this genus is recognized in *O. bienniformis* and *O. de Vriesii*.—L. Pace.

5443. PUYMALY, A. DE. Nouveau mode de division cellulaire chez les Conjuguées unicellulaires (Desmidiacées sensu lat.). [A new mode of cell division in the desmids.] Compt. Rend. Acad. Sci. Paris 176: 186-188. 1923.—A study was made of cell division in *Cylindrocystis crassa*, which has a mucilaginous envelope like that of *Gloeocapsa*. The daughter cells are included in the sheath of the mother cell, and the axes of the daughter cells are perpendicular to each other. In a clear equatorial zone the new transverse partition appears in the form of an annular diaphragm, the orifice of which gradually closes. The alga thus seems to have a primitive type of cell division.—C. H. Farr.

5444. RAPPEPORT, TH. Ueber die somatische Mitose des Menschen. [Somatic mitoses in man.] Arch. Zellf. 16: 371-382. Pl. 18, 2 fig. 1922.—The author reviews the literature and gives a table of the chromosome numbers obtained by the various investigators. A full account of the technique follows. The pleura, peritoneum, and amion were used on account of their flatness and the fact that they could be spread out thinly and studied without sectioning. The prophase and metaphase stages are described and figured. It was not possible to determine the chromosome number with absolute certainty, but it is unquestionably between 40 and 42 in somatic nuclei. Whether or not the number differs in the 2 sexes was not determined.—Ralph E. Cleland.

5445. SANDS, HAROLD C. Perigenesis. Science 56: 517-518. 1922.—A study of the division figures in *Tradescantia virginica* L., by the use of special methods of vital staining, shows that the chromosome structure is that of an achromatic cylinder with the chromatin imbedded in the form of chromomeres. There is no longitudinal splitting in vegetative or reduction divisions. Detailed publication is promised.—C. J. Lyon.

5446. SUGIYAMA, TAKESI. Studies of the structure and the nuclear division in a Japanese species of *Opalina*, *O. japonica* nov. sp. Jour. Coll. Agric. Imp. Univ. Tokyo 6: 361-390. Pl. 40-42, fig. 1. 1920.—This parasitic protozoan of *Rana* and *Bufo* is multinucleate and with the nuclei lacking a centrosome and a nucleole. The nuclei have 2 kinds of chromatin. The "vegetative" chromatin is comparable to the macronucleus of the higher Ciliata and the "generative" chromatin to the micronucleus. The nucleus is, therefore, considered to be in an undifferentiated primitive condition.—G. M. Smith.

5447. TAYLOR, W. R. Organization of heterotypic chromosomes. Science 56: 635. 1922.—This brief note on the behavior of the heterotypic chromosomes of *Gasteria* "tends to demonstrate a very great precision in the chromomere constitution of the meiotic chromosomes."—C. J. Lyon.

5448. TISCHLER, GEORG. Allgemeine Pflanzenkaryologie. [General plant karyology.] In: Handbuch der Pflanzenanatomie. Edited by K. LINSBAUER. I Abt., 1 Teil: Cytologie, Band 2. xiv + 899 p., 406 fig. Borntraeger: Berlin, 1921-1922.—This is an exhaustive review of present knowledge of the plant nucleus. It is copiously illustrated and fully supplied with references to the literature listed in a bibliography of nearly 5,000 titles. The contents are indexed under authors, subjects, and plant classes and families. Following is a brief outline of the topics treated in the 11 chapters: (1) the resting nucleus and its external morphology; (2) the chemical organization of the resting nucleus; (3) the morphological structure of the resting nucleus; (4) the resting nucleus as a component of the living cell. Here are discussed: interchange between nucleus and cytoplasm; the relation of the nucleus to plastids, centrosomes, and blepharoplasts; movements of the nucleus and their physiological significance; the relation of the resting nucleus to cell division; multinucleate cells. (5) Typical nuclear division. This includes accounts of promitosis and mitosis in lower organisms, somatic mitosis in higher plants, the mechanism of mitosis, and the connection of mitosis with cell division. (6) Allotypic nuclear division. Chromosome reduction in plants is treated very fully. (7) Irregular mitoses and amitosis; (8) nuclear fusion. This deals chiefly with sexual fusion in the various plant groups, but includes also an account of vegetative fusions. (9) The chromo-

somes and their significance for investigations of race and inheritance. The number, size, form and arrangement of chromosomes, and the relation of their behavior to Mendelism and mutation, are fully treated. A list of all known chromosome numbers in plants, originally published by the author in 1915, has been brought up to date and included in this chapter, with references to all of the original papers. (10) Degeneration and resorption of the nucleus; (11) the question of the enucleate condition of certain organisms.—*L. W. Sharp.*

5449. WINGE, Ö. A peculiar mode of inheritance and its cytological explanation. *Compt. Rend. Trav. Lab. Carlsberg* 14¹⁷: 1-10. 1 pl. 1922.—In the fish *Lebistes reticulatus* there are several races of males with distinct color patterns, whereas all females are similar. Male offspring from a cross always have the identical color patterns of the male parent; back crosses between male F_1 and the female parent again yield male offspring similar to the male parent. Back cross F_1 females with unmarked males yields only unspotted males.—A condensed account is given of spermatogenesis to the production of spermatozoa and their discharge, and of oogenesis through the primary oocyte. The number of chromosomes is the same in both sexes, being 23 in the haploid phase. This is conceived to be a combination of 22 autosomes plus an X or a Y sex chromosome. The presence of Y determines the male sex, and secondary sexual characters carried by this body dominate the allelomorphs of the autosomes.—*F. Weiss.*

5450. WYLIE, ROBERT B. A note on the sperms of *Vallisneria*. *Science* 56: 422-423. 1922.—In order to fix the sperms and ovules of *Vallisneria spiralis* it was necessary to squeeze the ovary contents out into water, which dissolved the mucilage about the ovules. Pieces of ice in this water cooled the ovary contents and slowed down the growth and cyclosis so that the fixing fluid could act on sperms in all situations through to the completion of fertilization.—The sperms travel down the pollen tube as male cells. The one that fuses with the egg flattens itself against the egg membrane. When the membrane is ruptured, the nucleus not only moves to the egg nucleus but there seems to be some mingling of cytoplasm.—*C. J. Lyon.*

ECOLOGY AND PLANT GEOGRAPHY

GEORGE D. FULLER, *Editor*

(See also in this issue Entries 5289, 5293, 5342, 5442, 5501, 5506, 5511, 5556, 5587, 5736, 5750, 5752, 5772, 5773, 5813, 5817, 5841, 5920, 5979, 5987, 6015, 6025, 6029, 6033, 6089, 6095, 6099, 6104, 6123, 6124)

GENERAL, FACTORS, MEASUREMENTS

5451. ANONYMOUS. Flora of New Zealand. [Rev. of: COCKAYNE, L. The vegetation of New Zealand. In: ENGLER, A., UND O. DRUDE. Die Vegetation der Erde. Sammlung pflanzengeographischer Monographien. XIV. xxiii + 364 p., 65 pl., 2 maps. W. Engleman: Leipzig, 1921.] *Nature* 111: 457-458. 1923.—The reviewer notes that the meteorological maps are quite deficient as to names and orographical details, the work being remarkably well accomplished otherwise.—*O. A. Stevens.*

5452. BIXBY, WILLARD G. Where may the northern pecan be expected to bear? *Amer. Nut Jour.* 17: 78. 1922.—Pecans require about 150 "pecan growing heat units" (calculated by totaling the average monthly temperatures above 50°F. in 1 year). They do well even with 105 heat units.—*E. L. Overholser.*

5453. BOYE-PETERSEN, J. Om Lysets Indflydelse paa Algernes Fordeling i Havet og deres Farver. [On the influence of light on the distribution and colors of marine algae.] *Nat. Verden* 7: 116-125. 1922.—A S. Ørsted outlined in 1844 the distribution of algae at different depths and sought the explanation in the changing colors of light transmitted through varying layers of water. In spite of further research the cause of this relation has not been determined. Engelmann may be right in his theory of the influence of different colors of light, but other factors, such as the light intensity, may also be of importance.—*Ernst Gram.*

5454. BRAUN-BLANQUET, J., et J. PAVILLARD. *Vocabulaire de sociologie végétale*. [Vocabulary of plant sociology.] 16 p. Montpellier, 1922.—This is an attempt to give in French with German equivalents a vocabulary of the accepted phytosociological terms used by the French and Swiss workers in this field. Among those used to denote the analytic characters of the species of plant communities are: abundance (l'abondance, Abundanz), the relative number of individuals; dominance (la dominance, Deckungsgrad, Arealprozent), the extent of surface occupied; distribution (la fréquence, Verteilungsart), the manner in which individuals are distributed in the population; sociability (la sociabilité, Geselligkeit), the disposition of individuals in the interior of an association; prosperity (la vitalité, Gedeihen), the completeness with which a species completes its cycle of development in a given population; periodicity (la périodicité), the seasonal duration; and dynamic behavior or genetic coefficient (comportement dynamique, bedingende Verhalten), the part played by the species in the development of the community. Different degrees of the various qualities are indicated numerically or, in the case of the last, by a set of conventional signs. The chief terms to denote synthetic characters are: constancy (la constance, Gesellschaftsstetigkeit), depending upon the number of sample areas of the association in which the species occurs; and fidelity or exclusiveness (la fidélité, Gesellschaftstreue), the degree to which the species is confined to the association. Five degrees of these 2 qualities are recognized. Other terms which have been more widely used and more commonly understood are also included. [See also Bot. Absts. 12, Entry 2999.]-*Geo. D. Fuller.*

5455. DASTUR, R. H., and W. T. SAXTON. *The oecology of some plant communities in the savannah formation*. Jour. Indian Bot. 3: 34-51. 2 pl. 1922.—This study was made on an undisturbed area about 90 × 800 m. near Ahmedabad (India), 23° 2' N. Lat., 73° 39' E. Long. Beginning at one end, Area I is dominated by *Cassia auriculata*, with less *Zizyphus rotundifolia*, *Cenchrus biflorus*, and *Indigofera enneaphylla*; Area II is dominated by *Cassia auriculata*; Areas III and IV by *Saccharum Munja*, dominance being more marked in Area IV. Many other plants are present in smaller amounts.—In the attempt to determine the cause of this floristic variation in what appeared to be a uniform habitat, 4 lines of investigation were carried out: (1) Detailed analysis of the vegetation of the 4 areas. Tables are given of the percentage of each species in the areas. (2) Soil analyses. The soil is almost pure sand, with little humus. No significant chemical differences in the 4 areas was found. According to moisture content, the areas are arranged II (highest), I, III, IV (lowest), and this order is maintained at all seasons. Mechanical analysis by passing the soil through sieves of 30, 60, and 90 meshes to the inch proved inadequate, so a thoroughly mixed sample of the 90-mesh screenings from each area was spread evenly on a glass slide and microphotographed. The particles of various sizes in unit areas of the photographs were counted, and the percentage weight of each size calculated. The order of the areas on the basis of percentage weight of soil particles less than 0.15 mm. in diameter also is II, I, III, IV, and the conclusion is that water holding capacity of the soil, determined mainly by particles 0.15-0.05 mm. in diameter, is the principal cause of the floristic differences. (3) Physiological anatomy of some of the more important plants. Details are given of leaf and root structure of 7 plants. No satisfactory correlation could be found between anatomical features and distribution. (4) Study of root systems of dominant plants. Long straight unbranched tap roots predominate. They penetrate from about 1.4 m. in small plants like *Boerhaavia* and *Lepidagathis* to 5.5 m. or more in old plants of *Crotalaria Burhia*.—*Winfield Dudgeon.*

5456. DODDS, CLIFFORD. *Further observations on the water hyacinth*. Monthly Bull. California Dept. Agric. 11: 759-760. 1922.—*Eichornia crassipes* Solms has proved an extremely dangerous and troublesome pest in southern U. S. A. and in the irrigated districts of northern Sinaloa, Mexico. It chokes streams and canals and fills in water holes. It has appeared near Centerville, Fresno, and should be exterminated before it gains too strong a foothold.—*E. L. Overholser.*

5457. EVANS, JOHN W. *A Peruvian desert*. [Rev. of: BOSWORTH, T. O. *Geology of the Tertiary and Quaternary periods in the north-west of Peru*. With an account of the paleontology by H. WOODS, T. W. VAUGHAN, J. A. CUSHMAN, and others. *xxii* + 434 p. MacMillan Co.: London, 1922.] *Nature* 111: 527-529. 2 fig. 1923.—This book is regarded as a classic of the desert. Figure 2 shows a cactus, "Rabo de Leon," growing among quartzite blocks.—O. A. Stevens.

5458. FISHER, R. A. *Paradoxical rainfall data*. *Nature* 111: 465. 1923.—A table is given showing the monthly distribution in $\frac{1}{4}$ -inch intervals over a period of 70 years at Rothamstead. The variability is so great that the mean values give little indication as to which month should be expected to be wet or dry.—O. A. Stevens.

5459. HAVERMANS, AUG. *Plaatselijke en kruidkunde*. [Local zoology and botany.] *Natuurwetenschap. Tijdschr.* 4: 234-241. 1922.—The writer confirms the statement of Caballera that *Chara foetida* makes water uninhabitable for mosquitoes of the genera *Culex* and *Anopheles*. Probably the plant secretes a toxin which is harmful to these insect larvae.—J. C. Th. Uphof.

5460. MARTIN, G. W. *Food of the oyster*. *Bot. Gaz.* 75: 143-169. Fig. 1-9. 1923.—Of the 3 sources of nutrition for oysters, small living organisms, organic detritus, and dissolved organic matter, the author treats only of the first 2. In the case of the Barnegat Bay (New Jersey) oysters studied, he finds diatoms to be less important than the nanoplankton. Of the latter, small flagellates and Peridineae are especially prominent. There obtains, however, an extreme variability in kind and amount of the food used from time to time due to changes in the available supply. Organisms washed to oyster beds from brackish ponds are important food elements. The author confirms, with reservations, the method of using the color and consistency of the gastric crystalline style as an indicator of the kind and amount of food taken. He finds some evidence to prove the rejection by the oyster of finely ground particles of the marsh grass *Spartina glabra* var. *pilosa*. It was found that the mucous discharges from the mouth region containing rejected living organisms tend to cling to the shell. Fecal matter is also added to the gelatinous content so that, as the writer puts it, "the oyster not only plants a garden but also fertilizes it." He was definitely able to show that the shell accumulations increased much more rapidly on the shells of living oysters than on shells which were filled with cement.—B. W. Wells.

5461. PAVILLARD, J. *Cinq ans de phytosociology*. [Five years of phytosociology.] 30 p. Montpellier, 1922.—The origin of this branch of ecological science is seen in a publication by Harper in 1917; among those who have contributed to its advance Rübel, Tansley, Braun-Blanquet, and du Rietz are mentioned. It places emphasis on the study of the structure of plant communities and the inter-relations of their members. Attention is focused upon the vegetation and not upon the habitat. The developmental or dynamic principle is recognized as the essential one in the interpretation of plant communities and the association is the fundamental unit comparable to the species in taxonomy. Associations are to be recognized and characterized by the exclusiveness or affiliation (fidélité) of the species composing them and designated according to the dominance of the species.—In discussing the grouping of associations Pavillard thinks that a natural system may be evolved based upon the "sociological progression" of Braun-Blanquet but the time has not come, apparently, for the formulation of such a classification. As the highest unit in such a classification he recognizes the "element" as employed by Braun-Blanquet, that is, the autochthonous and permanent vegetation of a phytogeographical region. The formation, he holds, is not a unit of vegetation superior to the association but a plant community, of any size whatever, characterized by a homogeneous physiognomy, or in other words, the formation is the growth-form (ground-form) of the association.—Geo. D. Fuller.

5462. SAXTON, W. T. **Mixed formations in time: a new concept in oecology.** Jour. Indian Bot. 3: 30-33. 1 *diagr.* 1922.—The author concludes that European and American classifications of plant communities cannot be applied to the vegetation of peninsular India, at least not in ways hitherto attempted. It is customary to think of any given stable area as occupied by 1 formation only, although displaying different aspects and floristic composition at different times. Europe and America have no habitat which even approximately corresponds to the Indian monsoon habitat, with its succeeding 8 months of drought. During the year a given area is subjected to 2 or even 3 such widely differing sets of conditions as to practically amount to distinct habitats: (1) during the monsoon both soil and air are almost saturated with water for about 3 months, when comparatively delicate mesophytic plants flourish; (2) if subsoil drainage is imperfect, toward the end of this period the soil becomes completely water logged and swamp conditions arise; (3) at the end of the monsoon both soil and air gradually become dry, culminating in about 7 months of intense drought, when markedly xerophytic plants are met with. Such an area "may be supposed to be xerophytic bushland in the months of April and May, equally to be a meadow with scattered bushes in July and August, and possibly also to be a marsh in September and October." This is not "succession" in the usual sense. It is suggested that the area cannot be regarded as occupied by "a single unit ('formation') of vegetation, but rather that two (or even three) entirely different plant communities regularly alternate with one another, though each persists to some extent through the dominant phases of the other, thus giving rise to the idea of 'Mixed formations in time.'"—*Winfield Dudgeon.*

APPLIED ECOLOGY

5463. DE SELLEM, GEO. B. **Inspectors corner.** The Western Honey Bee 10: 16-19; 47-50; 79-82; 111-113; 143-145; 207-209; 239-241; 267-268; 299-301; 332-336; 365-371. 1922.—In this department the bee inspectors of California report briefly each month as to the condition of the honey plants in the different counties of the state.—*J. H. Lovell.*

5464. SANDS, W. N. **The agricultural possibilities of Cameron's Highlands, Pahang.** Malayan Agric. Jour. 10: 269-280. 1922.—In the northwest of Pahang at an altitude of about 5,000 feet is a considerable area of open valley land now explored for the first time since its discovery by Cameron in 1885. Probably at least 2,000 acres could be used for the cultivation of *Cinchona* and tea, and other possible crops are suggested; some account is also given of the vegetation, soil, and climate. The Lubok Tamang district lies on the route to Cameron's Highlands at a mean altitude of 3,500 feet; about 500 acres suitable for tea and market garden crops are here available.—*R. E. Holtum.*

FLORISTICS

5465. ANONYMOUS. **The flora of an Indian island.** [Rev. of: ANNANDALE, N. *Introduction to the study of the fauna of an island in the Chilka Lake.* Mem. Asiatic Soc. Bengal 7: No. 4.] Nature 111: 378. 1923.

5466. F[YSON], P. F. [Rev. of: WILLIS, J. C. *Age and area, a study in geographical distribution and origin of species.* 251 p., University Press: Cambridge, 1922.] Jour. Indian Bot. 3: 182-183. 1923. [See also Bot. Absts. 12, Entry 4851.]

5467. HARPER, ROLAND M. **Some recent extensions of the known range of *Pinus palustris*.** Torreya 23: 49-51. 1923.—The range of the long-leaf pine has been extended in northwestern Alabama to Walker and Fayette counties, and in Mississippi to Newton County.—*J. C. Nelson.*

5468. KASHYAP, SHIV RAM. **Notes on some foreign plants which have recently established themselves about Lahore.** Jour. Indian Bot. 3: 68-71. 1922.—The indigenous vegetation about Lahore (India) approaches that of a desert. Nineteen plants are recorded as recently established. A few have washed down to the plains from the Himalayas, but most have come from abroad, mainly from America.—*Winfield Dudgeon.*

5469. NYGAARD, J. N. Botaniske Resultater. [Botanical results.] In: KOCH, L. Resultaterne af Jubilæumsexpeditionen Nord om Gronland 1921. [The results of the jubilee expedition north of Greenland 1921.] Nat. Verden 7: 74-76. 1923.—In this preliminary report of an expedition from Inglefield Gulf round Pearyland the author mentions his collections from Washington Land and Inglefield Land, of about 4,000 specimens, fossils and marine algae included. In Inglefield Land 2 localities gave each more than 100 species of higher plants, while Washington Land with its dry limestone has a very poor vegetation. Special mention is made of the distribution of *Salix herbacea* and *Hesperis Palasii*, and the occurrence of several species of *Taraxacum*.—Ernst Gram.

5470. PHILLIPS, R. A. Distribution of *Brachypodium pinnatum* in Ireland. Irish Nat. 29: 75. 1920.—This grass was first recorded from Ireland in 1898. Now several new localities are given; "wherever it grows it is the dominant species, driving all other plants before it with its strong creeping stem."—W. E. Praeger.

5471. STAGER, ROB. Beitrag zur Verbreitungsbiologie der Claviceps-Sklerotien. [Contribution to the biology of the dissemination of the *Claviceps sclerotia*.] Centralbl. Bakt. II Abt. 56: 329-339. Fig. 1-2. 1922.—The author points out some of the adaptations of *Claviceps sclerotia* to insure distribution. The sclerotia of the aquatic grasses have air chambers and consequently float. Those of the land grasses the seeds of which are provided with a pappus have somewhat reduced their specific weight; those of the grasses the caryopses of which are provided with awns or similar structures and depend on attachment for distribution have in no way lowered their specific weight.—Anthony Berg.

VEGETATION

5472. ANONYMOUS. Un bocage sur un bloc de pierre. [A grove on a block of stone.] Nat. Canadien 48: 173-177. 1 fig. 1921.—At "Pointe-aux Alouettes" between the confluence of the Saguenay and St. Lawrence is a block of rock with earth on it some 12 feet square carrying 3 birch and 2 Indian pear trees about 30 feet high the roots of which run into the earth beneath, as is well shown in the figure.—A. H. MacKay.

5473. ASHE, W. W. Forest types of the Appalachians and White Mountains. Jour. Elisha Mitchell Sci. Soc. 37: 183-198. 1922.—This paper treats specifically only the forest types of the Appalachian region. Those of the White Mountains are to appear in a later paper. More than 50 distinct forest types occur in the 2 regions. While the type is essentially permanent, oscillations and modifications occur by direct self-replacement under cover, by alternation, and by succession. For example, the chestnut type may with increase in peaty accumulation and greater acidity, become favorable for invasion by laurel. The types are separated by composition, by marked difference in height of dominant trees, and by the volume of wood. The sharpest transitions are due to differences in direction of slope and in abundance or scarcity of lime. In the Alleghanies, where stratification of rock is prevalent, the types are usually in horizontal zones along slopes and along ridges. For the Canadian life zone of the Appalachians 9 forest types are mentioned; for the transition zones 38 types; for the Carolinian area 9 types. The physiographic areas, with their associated forest types, are also tabulated. An appendix containing notes and references to literature is added.—W. C. Coker.

5474. BERTSCH, KARL. Pflanzengeographische Untersuchungen aus Oberschwaben. [Studies on the plant geography of Upper Swabia.] Jahresh. Ver. Vaterländ. Naturk. Württemberg 74: 69-172. 20 fig. 1918.—The 1st part discusses the numerous bogs of the region from the standpoint of floristics, ecology, physiography, and geology. The distribution of the characteristic bog plants of Swabia is given in great detail, including: *Vaccinium oxycoccus*, *Andromeda polifolia*, *Eriophorum vaginatum*, *Scheuchzeria palustris*, *Carex limosa*, *Melampyrum paludosum*, *Carex pauciflora*, *Trichophorum caespitosum*, *Lycopodium inundatum*, and *Malaxis paludosa*. Species from the bog-margins, treated in the same way, are: *Vaccinium uliginosum*, *V. vitis idaea*, *Carex cladorrhiza*, *C. helonastes*, *Lonicera caerulea*, *Viola palustris*,

and *Lysimachia thrysiflora*. In many cases the distribution is shown by means of maps, and the structure of certain bogs by diagrammatic plans and sections. The sedges considered in the 2nd part are *Carex alba* and *C. pilosa*, and evidence is cited to show that they entered Swabia shortly after the Ice Age. The carnivorous plants discussed in the 3rd part include 3 species of *Drosera* (with 2 hybrids), 6 of *Utricularia* (with 1 hybrid,) and 2 of *Pinguicula*.—A. W. Evans.

5475. BRICK, C. Die Erhaltung von Mooren. [The preservation of peat bogs.] Verhandl. Naturw. Ver. Hamburg. 25: xvii-xx. 1917 [1918].—The structure and development of the various types of bog are described; also the draining and utilization of many bogs in Germany during the war. A plea is made for the preservation of some of the more characteristic and beautiful bogs as natural monuments.—A. W. Evans.

5476. BRUNS, F. Botanische Wanderungen in Nordpersien. [Botanical journeys in northern Persia.] Verhandl. Naturw. Ver. Hamburg. 25: xxvi. 1917 [1918].—The author, who visited Persia in 1909 and 1910, contrasts the vegetation of the southern coast of the Caspian Sea, the rainy provinces of Gilan and Masanderan, the mountainous region of the Elbur, and the xerophytic plateau to the southward.—A. W. Evans.

5477. ENGEL, THEODOR. Ein botanisches "Naturwunder." [A botanical "natural wonder."] Jahresh. Ver. Vaterländ. Naturk. Württemberg 74: 275-277. 1 fig. 1918.—The author describes and figures a pollarded willow (*Salix alba*) in the crown of which a mountain ash (*Sorbus acuparia*) 2-3 m. high has established itself. The tree is growing in the vicinity of Eisingen, Germany. Attention is called also to the occurrence of the snowball and other woody plants in similar situations.—A. W. Evans.

5478. HARPER, ROLAND M. A botanical bonanza in Tuscaloosa County, Alabama. Jour. Elisha Mitchell Sci. Soc. 37: 153-160. 1 pl. 1922.—The area studied includes the bluffs, cliffs, and ravines along the Warrior River, a short distance above Tuscaloosa, which is on the fall line. A remarkable assemblage is listed and discussed and the author compares the locality favorably with the celebrated bluffs of the Apalachicola in Florida. A number of the species find their southern limits here, and 1 (*Croomia pauciflora*) its northern limit. Among the most interesting plants found were: *Quercus Muhlenbergii*, *Q. montana*, *Acer leucoderme*, *Cladrastis lutea*, *Croton alabamensis*, *Neviusia alabamensis*, *Hypericum aureum*, *Heuchera macrorrhiza*, *Dryopteris marginalis*, *Sedum Nevii*, *Viola canadensis*, *Asplenium Trichomanes*, *Dodecatheon Hugerii*, *Washingtonia longistylis*. The soil is strongly basic, containing 3.95 per cent of K_2O , though only 6.42 per cent of CaO . It is suggested that many supposed calciphiles are really potash-loving plants.—W. C. Coker.

5479. UPHOF, J. C. TH. Vegetationsbilder aus Kalifornien. [Vegetation pictures from California.] Vegetationsbilder 14: 1-24. Pl. 37-42. 1922.—A short description of the geography, topography, and climatic conditions of California is given together with the flora of the Sierra Nevada, the coastal region, the large valleys, the deserts, and the San Bernardino Mountains. The plates illustrate *Yucca* deserts, *Sarcodes sanguinea* in the Yosemite Valley, *Yucca* and *Ephedra* in the Mohave desert, *Eschscholtzia californica*, and *Neowashingtonia filifera* in Palm Canyon.—J. C. Th. Uphof.

STRUCTURE AND BEHAVIOR, SYMBIOSIS

5480. BERTSCH, KARL. Kalklebende Pflanzen in Oberschwaben. [Calciphilous plants of Upper Swabia.] Jahresh. Ver. Vaterländ. Naturk. Württemberg 78: 55-67. 1 map. 1922.—The author describes and indicates on the map the more important calciferous areas in Upper Swabia and gives an account of their geological history. He lists the plants under 3 categories: (1) those confined to calciferous habitats (33 species); (2) those strongly preferring such habitats and not found elsewhere in Upper Swabia (15 species); (3) those preferring calciferous habitats

but not absolutely confined to them (29 species). He then gives a detailed list of the calciferous areas and enumerates under each the calciphilous plants occurring there.—*A. W. Evans.*

5481. DASTUR, R. H. Vegetative reproduction by root runners in two species of *Clerodendron*. Jour. Indian Bot. 3: 143-147. 2 fig. 1923.—Healthy *C. infortunatum* L. and *C. fragrans* R. Br. plants propagate profusely from root runners growing about 10 cm. below the soil surface. The new plants are separated by progressive death of the old runners.—*Winfield Dudgeon.*

5482. GLÜCK, H. Systematische Zusammenstellung der Standortsformen von Wasser- und Sumpfgewächsen. [Systematic summary of the growth-forms of water and swamp plants.] Beih. Bot. Centralbl. II Abt. 39: 289-398. 1923.—One pteridophyte family, Marsiliaceae, 12 families of monocotyledons, and 24 families of dicotyledons, including about 130 species, are described. The size of plant, leaf, etc., is described for each habitat, —water, land, submerged, floating, etc.—*L. Pace.*

5483. IYENGAR, M. O. TIRUNARAYANA. On the biology of the flowers of *Monochoria*. Jour. Indian Bot. Soc. 3: 170-173. 4 pl. 1923.—*Monochoria hastaeifolia* Presl. and *M. vaginalis* L., both common in India, show floral dimorphism related to cross pollination. The single fertile stamen bends either to the right or left, while the style bends in the opposite direction. Flowers of both types occur in the same inflorescence, but the flowers opening on any one day in an inflorescence usually are of the same type. Pollination is mainly by bees. Bagging experiments show that if cross pollination fails, self pollination can take place.—*Winfield Dudgeon.*

5484. SEIFRIZ, WILLIAM. Observations on the cases of gregarious flowering in plants. Amer. Jour. Bot. 10: 93-112. 1 pl. 1923.—The author discusses drought as a factor in causing gregarious flowering in several species of bamboo and in the talipot palm, bringing together data from Jamaica, India, Ceylon, Java, and other regions in the tropics. He concludes that drought is not an important factor, although the remarkable flowering of talipot palms, 2 species of bamboo, and *Bauhinia anguina* at the same time in Ceylon during 1918 suggests the action of some environmental cause of which we are ignorant. Many of the bamboos have a long but very regular sexual cycle, at the close of which all individuals flower and die. Neither depletion of nourishment nor injury seems to be the cause of this cycle. The gregarious flowering of the orchid *Dendrobium crumenatum*, which is clearly caused by environmental factors, is described. The author briefly discusses the causes and origin of sexual periodicity and other growth rhythms.—*E. W. Sinnott.*

FOREST BOTANY AND FORESTRY

W. N. SPARHAWK, *Editor*

(See also in this issue Entries 5473, 5849, 6027, 6084, 6095, 6109)

5485. ANONYMOUS. Annual return of statistics relating to forest administration in British India for the year 1920-21. 29 p. Calcutta, 1922.—This is the customary set of tables for all the British India states, covering the work of the Forest Department. The total area of forests is 250,473 square miles, or 23.1 per cent of total area of the provinces. The percentage of forest varies from 1.4 in Baluchistan to 64.3 in Burma and 70.2 in the Andamans. Artificially marked boundaries total 151,192 miles and forest settlements total 5,146 square miles. The forest survey maps now cover 88,511 square miles, 1,420 having been covered during the year. Working plans cover 59,584 square miles, or 23.8 per cent of forest area. Expenditures on communications and buildings totaled Rs. 33,55,747, in pursuance of the policy of developing the forest property. Forest offences totaled 83,300, the lowest number during the past 5 years. Fire protection was attempted on 44.2 per cent of area of reserves, and 5.6 per cent

of the attempted area burned over, the highest for 5 years, although the number of fires, 4,391, was well below the average. Practically $\frac{2}{3}$ of the forest was open to all grazing animals for the entire year, and 12,159,000 head of stock were carried. The area of plantations increased by 1,600 acres to a total of 169,175 acres, of which 104,108 acres are taungyas. The outturn of timber and fuel was 298,654,000 cubic feet, the lowest for 5 years, while minor produce was of about average value at Rs. 1,36,00,627. The average cut per square mile was 1,192 cubic feet. About 15 per cent of timber and 8 per cent of fuel was removed by Government agency. Total revenue for the year is estimated at Rs. 5,41,00,000 and expenditures at Rs. 3,62,00,000. Fifty years ago the corresponding figures were Rs. 56,30,000 and Rs. 39,33,000, indicating the great growth both in scale of operations and in returns.—*S. B. Show.*

5486. ANONYMOUS. *Bosques*. [Forests.] *Agric. Mexicano y Hogar* 39: 67-74. 1923.—A plea is made for the conservation of existing Mexican forests and for reforestation of the extensive denuded areas.—*John A. Stevenson.*

5487. ANONYMOUS. *Commerce d'importation et d'exportation des bois en 1920*. [Imports and exports of wood during 1920.] *Bull. Soc. Centrale Forest. Belgique* 29: 628-636. 1922.—Although the years 1919 and 1920 marked such a peak of timber cutting that a special law was passed to stop the devastation, the Belgian timber imports for 1920 amounted to nearly half a billion francs in value. Tables compare imports and exports in 1913 and 1920, by classes of materials and by countries. Sweden has become the leading source of supply for Belgium, while France has become the leading purchaser.—*H. T. Gisborne.*

5488. ANONYMOUS. *Conseil superieur des forêts*. [Superior forest council.] *Bull. Soc. Centrale Forest. Belgique* 29: 638-641, 680-688. 1922.—Accounts of the meetings of the Council on June 21, 1922 are given.—*H. T. Gisborne.*

5489. ANONYMOUS. *Conseil superieur des forêts*. *Exploitation abusive des forêts particuliers*. *Interdiction*. *Reglementation*. [Superior council of forests. Devastation of private forests. Control. Regulation.] *Bull. Soc. Centrale Forest. Belgique* 28: 611-620. 1921.—Discussion and conclusions by the members of the council concerning the new law for controlling timber cutting on private holdings are reported. This concludes the discussion which has been published in previous numbers of this journal [see Bot. Absts. 11, Entry 3675; 12, Entry 3042].—*H. T. Gisborne.*

5490. ANONYMOUS. *Experiences en pepinieres*. [Nursery experiments.] *Bull. Soc. Centrale Forest. Belgique* 29: 574-582. 1922.—Some results are given of experiments with the seed of *Pinus silvestris*, *Robinia pseudacacia*, and *Ulmus* sp. No indicative results were obtained by various methods of soaking the pine seed. No definite results have yet been obtained showing the effect of the vigor of the parent, although many old foresters believe that the stunted, or vigorous, condition of the parent is transmitted to the seedling. No definite results were obtained from experiments to determine the influence of age of the parent (15, 20, and 25-year-old parents were utilized).—*H. T. Gisborne.*

5491. ANONYMOUS. *Experiences en pepinieres*. [Nursery experiments.] *Bull. Soc. Centrale Forest. Belgique* 29: 612-620. 1922.—Results are given of experiments in sowing seed of ash, hornbeam, linden, and cherry gathered from the tree at different dates in the fall. Some "general observations on the sowing of green seeds" are made, and the production of stump shoots, or sprouts, from maple is discussed.—*H. T. Gisborne.*

5492. ANONYMOUS. *Loi portant nouvelle prorogation de la loi du 28 janvier 1921*. [Law again prolonging the law of January 28, 1921.] *Bull. Soc. Centrale Forest. Belgique* 29: 601-602. 1922.—The law of Jan. 28, 1921, authorizing the Government to oppose excessive exploitation of certain woods and forests in private ownership is prolonged in effect until December 31, 1923.—*H. T. Gisborne.*

5493. ANONYMOUS. *Loi portant prorogation de la loi du 28 janvier 1921, autorisant provisoirement le Gouvernement à s'opposer à l'exploitation excessive de certains bois et de certaines forêts.* [Law continuing the action of the law of January 28, 1921, authorizing the Government to oppose excessive exploitation in certain woods and forests.] Bull. Soc. Centrale Forest. Belgique 28: 610-611, 655-666. 1921.

5494. ANONYMOUS. *Marche du bois.* [The lumber market.] Bull. Soc. Centrale Forest. Belgique 29: 688-691. 1922.—October and November, 1922, stumpage prices are given for various species and localities, according to size of trees. One oak tree of 260 cm. circumference and containing about 5 cubic m. brought the maximum price of 350 francs per cubic m. Scotch pine and spruce brought about 50 francs per cubic m.—*H. T. Gisborne.*

5495. ANONYMOUS. *Personnalité civile de la Société.* [Organization of the Society.] Bull. Soc. Centrale Forest. Belgique 29: 676-679. 1922.—An account is given of a proposed change in the organization of the Belgian Forestry Society.—*H. T. Gisborne.*

5496. ANONYMOUS. *Progress report of forest research work in India for the year 1920-21, including the administration report of the Forest Research Institute, Dehra Dun. 1-84.* 1922.—The report covers the period July 1, 1920-March 31, 1921. Progress is being made in enlarging the Institute at Dehra Dun. Thirty-four plots were remeasured during the year by the Central Institute. Study of development of established sal reproduction continues to be an important project, and the work is being enlarged to include other valuable species. Artificial regeneration experiments with many species are under way. The work under charge of the various provincial silviculturists shows a wide range of experiments in both natural and artificial regeneration. Burning as an aid in establishing sal reproduction is being tested. Particular attention is being given to the evergreen forests of Assam where the valuable species are in the minority. Cutting and burning of the inferior species, and occasionally clearing and planting, offer best promise of success. In Madras work is under way on the difficult problem of establishing reproduction during the summer heat. In all provinces attention is being given to the remeasurement of permanent plots. In Burma much work in artificial regeneration of teak is under way. Under the heading of Forest Botany the work in group and strip regeneration of sal is described. Experiments indicate that a similar system will prove best for teak. A large amount of work in forest products is being undertaken, dealing with wood technology, testing, preservation, seasoning, minor products, paper, etc. Under Forest Zoology it is noted that relation between rainfall and prevalence of the sal borer is established. A systematic compilation of food plants of important insects is under way. Under Forest Chemistry the work deals with gums, oils, and oleo-resins. Better facilities are needed for publication of results. The administrative report for the Central Institute shows an expenditure for the 9 months of Rs. 2,71,996 compared to Rs. 2,16,270 for the entire preceding year.—*S. B. Show.*

5497. ANONYMOUS. *Protection des oiseaux insectivores.* [Protection of insectivorous birds.] Bull. Soc. Centrale Forest. Belgique 28: 650-655. 1921.—The text is given of a new law applying to the protection of 24 insect-eating birds.—*H. T. Gisborne.*

5498. ANONYMOUS. *Report on the forest administration of the Bombay Presidency (including Sind) for the year 1919-20. 131 p.* Bombay, 1921.—This is the usual administrative report covering all phases of the work of the Forest Department. The area is now 14,947 square miles, 24 less than the preceding year. Working plans continue in arrears, due to shortage of staff, and new plans are needed on 2,640 square miles and revision of old plans on 4,845. New roads to the amount of 181 miles were constructed, and Rs. 1,69,960 were spent on housing. The total of forest offences declined from 22,812 to 19,303, of which 2,271 were injury by fire. Fire protection was attempted on 11,195 square miles and was successful on 94.9 per cent, at an average cost of Rs. 5.9 per square mile. Incendiarism is the principal cause of fires. A total of 2,186,000 head of stock used the forests, compared to 2,674,150 the

previous year, the decrease being due to famine. Seed was generally satisfactory. The total area of plantations is now 39,352 acres, an increase of 4,220 acres. Cultural operations were carried out on 7,362 acres in the Northern Circle and on smaller areas elsewhere. The minor products are being used to an increasing extent. The total outturn of major produce was 1,179,000 cubic feet less than the previous year, due to the ending of the war, and lowered prices. The Government sawmill showed a profit. Thinning on 314 coupes realized a profit of about Rs. 9,000. Departmental exploitation produced 1,737,000 cubic feet of timber out of a total of 5,714,000, and 6,773,000 out of 39,040,000 cubic feet of fuel. The net revenue was Rs. 28,92,626, or Rs. 8,22,915 less than the preceding year. Considerable research work was done, largely in artificial regeneration. The increase in wages and shortage of labor due to the influenza epidemic greatly hampered operations. Capital investment in communications and improvements is evidently necessary both to increase the area worked and the revenue. The usual detailed tabular summaries of work are included.—*S. B. Show.*

5499. ANONYMOUS. **Report of the forest administration in the Bombay Presidency (including Sind) for the year 1920-21.** 130 p. Bombay, 1922.—The report is made to correspond with the fiscal year and covers a period of 9 months. The area of forests decreased by 17 square miles to a total of 14,929 square miles. Working plans are in force on 7,841 square miles, but revisions are needed on 4,614 square miles, and new plans for 2,177. Work is still hampered by lack of personnel. New construction was much less than the preceding year, only 59 compared to 181 miles of road having been built. Forest offences increased from 19,303 to 20,050, fire offences showing the largest increase. Fire protection was unsatisfactory, a total of 1,131 square miles or 10.6 per cent of total attempted area having burned over, due to the dry season and the hostility of the natives. One fire covered a distance of 15 miles and burned 60,000 acres in 24 hours. It is suggested that early burning is the only remedy for such occurrences. Animals grazed increased about 200,000 to a total of 2,338,500. In most of the forests the weather was unfavorable and seed and natural regeneration were poor. The usual cultural operations were carried out on cutting areas, such as weeding of seedlings, sowing of teak, and thinnings. Clear fellings were used in the Thana forests; elsewhere improvement fellings and unregulated cutting were the principal systems of management. Difficulties of labor and transport were serious and the total amount of timber cut was 4,803,000 cubic feet compared with 5,714,000 the previous year, while the figures for fuel are 35,108,000 and 39,041,000 cubic feet. Departmental exploitation accounted for about 25 per cent of the timber and 12 per cent of the fuel. Heavy capital investment is necessary to insure transportation facilities, since contractors and local transport are not dependable. Minor products such as sandal, paper pulp, resin, and tannin, were extracted from the forests to a value of Rs. 11,29,496. Financially, the year shows a decrease in net revenue of Rs. 11,86,460 from the previous year. Personnel is still inadequate for handling the work, and difficult season, famine, and political agitation made the year a particularly difficult one. The most serious trouble is the hostility of the people in many places.—*S. B. Show.*

5500. ANONYMOUS. **Service des aménagements. Année 1921.** [Forest management, year 1921.] Bull. Soc. Centrale Forest. Belgique 29: 586-588. 1922.—Eight tables are given showing the results accomplished in: (1) management plans revised; (2) extent of reserved areas; (3) conversion of ruined woods into coniferous and mixed forests; (4) conversion of coppice with standards into high forest; (5) conversion of simple coppice into coppice with standards and into high forest; (6) lengthening the rotation of coppice under standards; (7) lengthening the rotation of simple coppice; (8) reducing the period of return in broad-leaved forests.—*H. T. Gisborne.*

5501. ANONYMOUS. **The forest formations of Western Australia: No. 1, the karri forest.** Australian Forest. Jour. 6: 52-54. 1923.—The karri (*Eucalyptus diversicolor*) forests endemic to the extreme south and southwest of Western Australia are briefly discussed.—*C. F. Korstian.*

5502. ALLEN, E. T. **America's transition from old forests to new.** Amer. Forest. 29: 67-71, 106. 5 fig. 1923.—Every forested country generally passes through 3 well-defined stages of economic development: (1) the wholly inconsiderate exploitation period, from which the U. S. A. has emerged; (2) the period, which the U. S. A. has entered, of alarm, conservation, and tentative experimentation with actual reconstruction methods; and (3) the final inevitable settling down into such fairly adequate forest production as comparative land values warrant, with the burden and benefit divided between public and private agencies according to their facilities and needs. To be continued.—*Chas. H. Otis.*

5503. ANDERSON, C. R. **Harvesting Christmas trees by topping.** Amer. Forest. 28: 731. 2 fig. 1922.

5504. BAKER, O. E. **Land utilization in the United States.** Geographical aspects of the problem. Geog. Rev. 13: 1-26. 1923.—This paper discusses in detail the present use of land, particularly for agriculture, the possibility of increasing the area of agricultural land and the yield per acre, and the present trend in land utilization and in agricultural production. At present no potential agricultural land is unutilized that does not involve unprofitable expense for reclamation or clearing. Considerable areas are not reverting to forest or pasture. Only about 40 per cent of the land area can ever be used for crops, and while the population is increasing rapidly the area of cultivated land is increasing but slowly. About 50 million acres of cutover lands can be turned into agricultural use, but at a high expense for clearing; and, moreover, most of this can be used more profitably for forest than for crops. It is stated that by ceasing to export agricultural products, by reclaiming all reclaimable land, and by increasing yields per acre, a population of 275 million could be provided for. Change in consumption from the present meat diet to one more completely vegetable in character would also solve the problem of an increased population. The present trend is toward a gradual increase in area of improved farm land with decrease of labor applied, and increased use of machinery and fertilizer. There is also an apparent trend toward more intensive use of the best lands, and use of poorer lands for grazing only. Increased importation of agricultural products probably will help to solve the problem.—*S. B. Shaw.*

5505. BALON, A. **Excursion forestière en 1920, seconde journée.** [Second day of the 1920 forester's excursion.] Bull. Soc. Centrale Forest. Belgique 28: 635-648. 1921.—The area of 4,248 hectares of the Hertogenwald is described as to its timber, management, soil, climate, altitude, topography, roads, game, improvements, exploitation, and nurseries.—*H. T. Gisborne.*

5506. BARBOUR, T., and W. S. BROOKS. **The Sapo Mountains and the Sambu Valley: a biological reconnaissance in southeastern Panama.** Geog. Rev. 13: 211-222. 1923.—Forests of the region are discussed in connection with the human and animal life.—*S. B. Shaw.*

5507. BEESON, C. F. C. **Damage to timber by insects.** Indian Forest Rec. 9⁵: 227-239. 1922.—In connection with seasoning of woods from Indian forest trees, it is pointed out that defects in manufactured forest products may have been due to damage to the tree prior to manufacture. Measures of seasoning adopted for one locality can not be applied to others because of the presence or absence locally of borers, while the season of felling or girdling influences materially the liability of a species to damage. Green conversion or removal of the bark from logs will permit damage from borers. The insect species which damage the wood are listed with a description of the damage caused; in many cases the woods involved are given.—*E. N. Munns.*

5508. B[IOLE]Y, H. **Eclaircie "par le haut" et éclaircie jardinatoire.** [Thinning "from above" and selective thinning.] Jour. Forest. Suisse 72: 181-186. 1921.—In certain forestry circles of Romanic Switzerland both terms are used indiscriminately to denote the same operation, thus causing confusion. Biolley objects to the misuse of terms and proceeds to

show that although the 2 methods of thinning may be analogous or even coincide at times, they necessarily differ in aim and subsequent progression. The method of thinning from above or the French method, as set forth and practised by Boppe, is compared point for point with the method of selective thinning, as defined by Gurnaud. The comparison is thus summarized: (1) thinning from above consists in the removal of competing trees (i.e., by liberation in a lateral direction) and tends to establish a shelterwood forest; (2) selective thinning consists in the removal of intermediate trees (i.e., by liberation in a lateral and downward direction) and tends to establish a selection forest. Biolley cites the results obtained by 2 foresters working under identical conditions and having apparently the same aim. Due to a difference in application of 4 successive thinnings one stand corresponds to a thinning from above and the other to a selective thinning.—*G. Kempff.*

5509. BILLEY, H. *Réponse à Monsieur P. de Coulon.* [Reply to P. de Coulon.] Jour. Forest. Suisse 73: 49–52. 1922.—Biolley fails to see the exact point of de Coulon's criticism [see Bot. Absts. 12, Entry 5524] and therefore his reply is of a general nature. He proceeds to prove that he champions freedom of practice and individuality of the forester's art. The Méthode du Contrôle, the forest, and the best practice are to be considered hypothetical; consequently any method used must demonstrate its usefulness *a posteriori*. Although the method has proved successful in a practice extending over 30 years, Biolley states that it is not a panacea. It can be employed only in forests with special conditions, much depending upon the will and ability of the managing forester; it is a constant guide, not a hindrance, to a definite, unhampered practice. Several reasons are given why an ocular estimate, only, of the progress in a stand is misleading, concluding that the method is submitted in good faith as a successful experiment, although search for a more efficient method continues.—*G. Kempff.*

5510. BILLEY, H. *Une expérience de communisme sûr la forêt.* [An experiment in forest communism.] Jour. Forest. Suisse 73: 61–65, 83–85. 1922.—The author turns to the history of communism in the forests of the canton of Neuchâtel, dating from the earliest colonization to the end of the 18th century. Under this social system the forests were considered "free for all," without restriction and without thought of their exhaustion. Late in the 14th century parties obtained leases of parts of the forest for their exclusive and unrestricted use. This custom extended until the communes in the canton became alarmed and restored the forests to "unrestricted free use." The misuse of forests continued until the first forest reserve of 30 hectares was set aside in 1567. This precedent was followed by other communes and thus the "absolute free use," handed down from generation to generation, was slowly broken down.—Through the efforts of the commune of Couvet, the entire canton decided in 1765 to abolish "unrestricted free use" and to encourage natural regeneration, in order to avert a timber famine. This step hastened the creation of forest reserves and their administration in the interest of the general public. Actual progress in the application of the new policy, however, was very slow, due to constant political interference on the one hand, and lack of a technically trained forest personnel on the other. It is pointed out that the present prosperous state of the canton is due to the abolition of forest communism.—*G. Kempff.*

5511. BOMMER, CH. *Les forêts de la region mediterraneene en France.* [Forests of the Mediterranean region in France.] Bull. Soc. Centrale Forest. Belgique 29: 545–556, 665–673. 1922.—A general description is given of the herbaceous and tree associations found in the French Mediterranean region with references to a few particular cases of succession and their controls.—*H. T. Gisborne.*

5512. BRADLEY, J. W. *A plantation of remarkable growth.* Indian Forest. 48: 637–640. Pl. 18. 1922.—To furnish fuel, a plantation of *Albizzia moluccana* was established in 1915, seed being sown 12 × 12 feet and the area interplanted. The average tree was 86 feet in height and had a girth of 2 feet 6½ inches, making 3,000 cubic feet per acre in 7 years. From this plantation 60 pounds of seed were collected and the return from thinnings, etc., amounted to Rs. 1,050, paying for the plantation with the major stand yet untouched.—*E. N. Munns.*

5513 BRADLEY, J. W. **Report on forest administration in the Andamans for the year 1920-21.** ii + 42 p. Calcutta, 1922.—This is the customary annual report of the work of the forest department, but covers only a 9 month period, since the forest and fiscal years are being made to coincide. The area of forests remains at 2,207 square miles, on 708 of which working plans are nominally in force. An attempt was made to substitute wood for coal as fuel, but with indifferent success. Improvements needed for forest purposes, such as roads and trams, were constructed, the total capital investment being Rs. 2,28,000. The area of plantations remains at 2,063 acres, and other cultural operations covered 2,112 acres. The species planted are chiefly teak, padauk, and mangrove. Thinnings were made in the earlier mangrove plantations, established in 1897. Clear cutting with artificial regeneration is now the silvicultural system in force. About 90 per cent of timber was extracted by Governmental agency, the total amount being 729,000 cubic feet. The usual confusion in current and capital expenditures makes a real understanding of the finances difficult. Apparently the Department is more than paying its way. The problem of labor is very difficult, as convict labor is to be abolished and free men are difficult to secure. Development of the forest property is seriously hampered, and a permanent population appears as the only solution. The usual detailed statistical summaries are given.—*S. B. Show.*

5514. BRUNER, E. MURRAY. **Agricultura y silvicultura.** [Agriculture and silviculture.] *Rev. Agric. Puerto Rico* 6^o: 17-21. 1921.—The author emphasizes the importance of reforestation in Porto Rico, which is now largely denuded of forests and dependent upon imports for fuel and other forest products. Half of its area is waste land capable of being reforested.—*John A. Stevenson.*

5515. BRUNER, E. MURRAY. **Ciertos elementos de la situación forestal como factores determinantes, en consideración del presupuesto del servicio forestal de Puerto Rico para los años fiscales 1921-23.** [Certain elements of the forestry situation as determining factors in consideration of the estimates for the fiscal years 1921-23.] *Rev. Agric. Puerto Rico* 6^o: 25-31. 1921.—The author reviews the past and present forestry situation in Porto Rico as a basis for outlining the needs of the forest service of the Island in the coming biennium.—*John A. Stevenson.*

5516. BRUNER, E. MURRAY. **Informe del silvicultor.** [Report of the silviculturist.] *Rev. Agric. Puerto Rico* 6^o: 15-24. 1921.—The deforestation of Porto Rico has been going on for 4 centuries and 50 per cent of the land or over a million acres is now abandoned or affords only scanty pasturage. Such a condition emphasizes the need of forestry work on the Island. The Insular service now has under protection 15,000 cuerdas of mangrove swamp lands along the coast from which the crop is being sold as it becomes available. Other Insular forests are located near Guaynilla, Guanica, Maricao, and on Mona Island, totaling about 25,000 cuerdas. An experiment station has been established at Rio Piedras, including nurseries for tree production. The trees produced here will be used for planting on the Insular forests and along public roads.—*John A. Stevenson.*

5517. BRUNER, E. MURRAY. **Informe sobre la situación de la silvicultura en Puerto Rico.** [Report on the forestry situation in Porto Rico.] *Rev. Agric. Puerto Rico* 8^o: 43-50. 1922.—The author discusses the present forestry situation in Porto Rico and the prospects for future development. Approximately $\frac{1}{2}$ of the area of the Island is unsuited to agriculture and might well be put under forest growth.—*John A. Stevenson.*

5518. BRUNER, E. MURRAY. **La extensión forestal en Puerto Rico una necesidad económica.** [Forest extension in Porto Rico an economic necessity.] *Rev. Agric. Puerto Rico* 9^o: 19-25. 1922.—Porto Rico has been practically denuded of forest growth, making artificial regeneration necessary. The author discusses the effect of forests on climate, soil, and stream flow. Considerable progress has been made by the Insular forest service in establishing nurseries, making planting plans, and in taking under management such remnants of forests as still exist.—*John A. Stevenson.*

5519. BUTLER, O. M. **Henry Ford's forest.** Amer. Forest. 28: 725-731. 7 fig. 1922.—The author visited this forest of about 400,000 acres, located in the upper peninsula of Michigan, and recently acquired by Henry Ford. The most modern methods of lumbering are practiced.—*Chas. H. Otis.*

5520. BUTLER, O. M. **Our forest hunger.** Amer. Forest. 29: 3-13. 12 fig. 1923.—This popular article depicts the ways in which forests and their products enter everyday affairs and activities.—*Chas. H. Otis.*

5521. BUYSSENS, JULES. **Forêt, nature et art.** [Forest, nature and art.] Bull. Soc. Centrale Forest. Belgique 29: 621-625. 1922.—The aesthetic value of a few trees is compared with that of an entire forest.—*H. T. Gisborne.*

5522. C. **La rouille vesiculaire du pin Weymouth.** (*Peridermium Strobi*.) [*Peridermium Strobi* on the Weymouth pine.] Bull. Soc. Centrale Forest. Belgique 28: 600-602. 1921.—*Peridermium Strobi*, which has become serious within the last 20 years in Belgium, threatens greatly to reduce or even to eliminate the growing of Weymouth pine. Five rules, formulated by Badoux, of the forest school at Zurich, are given for the proper handling of the species in order to reduce the danger of *Peridermium* infection.—*H. T. Gisborne.*

5523. C., N. I., et CTE. F. G. D'A. **Le prix des plantes en 1922.** [The price of plants in 1922.] Bull. Soc. Centrale Forest. Belgique 29: 567-574. 1922.—Nurserymen's prices for seedlings in 1922, some of which are given, are characterized as "exorbitant." Planting becomes a luxury available only to those who do not need to make a profit from the investment. These high prices are maintained by agreement or order of the nurserymen's syndicate, and great harm is bound to result.—*H. T. Gisborne.*

5524. COULON, P. DE. **Jardinage cultural ou Méthode du Contrôle.** [Cultural selection or method of control.] Jour. Forest. Suisse 73: 45-49. 1922.—Inventory revisions may be made as desired. The following specific provisions of the working plan are critically reviewed: (a) determination of thinning intervals; (b) establishment of thinning subdivisions; and (c) determination of the initial yield. The Méthode du Contrôle used by Biolley is regarded by de Coulon as of no practical use, except as a demonstration *a posteriori*. Field examinations are stressed as in every way superior to regulation by inventory figures. De Coulon states that his criticism is directed not against Biolley's praiseworthy book "Method of Control in Forest Management," nor against his practical demonstration of the Méthode du Contrôle during the last 30 years in the majority of the forests in the canton of Neuchâtel, but against the impression that cultural operations in selection forests depend upon the universal application of "methodic control." The article closes with an appeal for the preservation of the 300-year-old trees in the forests of the canton, the cutting of which is now threatened in consequence of the rigid application of the Méthode du Contrôle. [See also Bot. Absts. 12, Entry 5509.]-*G. Kempff.*

5525. COX, WM. T. **The fire call of the north woods.** Amer. Forest. 28: 707-711. 4 fig. 1922.—This article pertains particularly to Minnesota. Reasons are given for the increased prevalence of forest fires. The greatest fire hazard came with the demand for drainage ditches, which have helped to dry out the swamps and grass lands. 252,000 acres of land burned over in the summer of 1922.—*Chas. H. Otis.*

5526. DALRYMPLE-HAY, R. **Report of the Forestry Commission [of New South Wales] for the year ended June 30, 1922.** 15 p. Sydney, 1923.—This is the 6th annual report. Plantations of Monterey pine during the year amounted to 1,488 acres, much less than needed since importations of softwoods amounted in value to £1,478,000. On state forests, 33,975 acres were treated for regeneration and 10,920 acres were thinned. Over 204,000 railroad ties were supplied by state forests to the railway department. Forest fires burned 51,500

acres on a protected area of 850,000 acres. An additional 177,696 acres of state forests were proclaimed, bringing the total to 5,371,994. The area of timber reserves is 1,479,792 acres. New working plans were made for 152,324 acres, the total now being 1,027,361 acres. Timber converted amounted to 14,653 M board feet. The total revenue was £217,841 and administrative expenses £64,942. The consumption of native lumber in the State was 356,932 M board feet, and 145,646 M board feet were produced under license. The State was represented at the Australian forestry conference. Investigations of tanning materials and of native species for wood pulp were made.—*S. B. Show.*

5527. DELEVOY, G. Notes sur l'accroissement du hêtre dans la forêt de Soignes. [Notes on the growth of beech in the forest of Soignes.] Bull. Soc. Centrale Forest. Belgique 28: 579-599. 1921.—Beech is the most important broad-leaved forest tree in Belgium. Tables show volume growth; stand density and volume; mean tree measurements by decades up to an age of 120 years for one parcelle, and 160 years for another, with tree diagrams for each case. Growth is then discussed by height, diameter, longitudinal section, basal area, cubic volume, and form. A table of form coefficients is appended.—*H. T. Gisborne.*

5528. DOCHNAHL. Ueber Band und Flechtweiden. [Concerning hoop- and basket-willows.] Illus. Landw. Zeitg. 43: 27. 1923.—This is a discussion of species and varieties of willow suitable for basket-making and for agricultural use in tying and braiding operations.—*John W. Roberts.*

5529. ELLIS, LEON MCINTOSH. New Zealand. State Forest Service. Report for the year ending March 31, 1922. 25 p. Wellington, New Zealand, 1922.—The report covers the 1st full year of operation of the Forest Service. A modern Forests Act became law, and though hampered by lack of technical force, good progress was made. The total area of state forests increased to 7,181,975 acres. The state plantations total 42,000 acres, and extensive areas have been planted by private owners. Fires burned over only 5,200 acres, the result of better protection and a favorable season. The inventory of forest resources is half completed. Expenditures were £107,582, of which £47,371 was for planting work; receipts increased to £30,836 in spite of a slump in the timber market. Great emphasis is being placed on public education in care with fire, tree planting, and the value of the forests. Research work is being undertaken aggressively, though with inadequate personnel. Economics, products, and the silvics and silviculture of important trees and forest types, as well as planting, are all under investigation. Experimental planting of sand dunes has been begun. Timber shortage is already evident in certain districts. Imports of timber continue heavy. Detailed tabulations covering the important features of work are appended.—*S. B. Show.*

5530. FARRINGTON, H. A. Annual progress report on forest administration in the Presidency of Bengal for the year 1919-20. 50 p. Calcutta, 1921.—The area of forests remained at 10,407 square miles, located on the fringes of the Province. Work was adversely affected by shortage of staff. One new working plan covering 27 square miles was put into effect and 4,805 square miles of forest are now under plan. Departures from the plans were necessitated by lack of demand and revision of plans. Good progress was made in housing, but little in construction of roads. The total number of forest offences dropped from 3,694 to 3,269, and convictions were obtained in 94 per cent of the cases. Fire protection was successful on 99.4 per cent of the 400,000 acres on which it was attempted. Sal fungus is under study, but definite conclusions can not be stated. Lantana is spreading rapidly and every effort is being made to eradicate it. Natural reproduction of the more valuable species is unsatisfactory, and present plans provide for artificial regeneration under the taungya system. With the cessation of war demands departmental operations decreased, but the total value of sales was Rs. 16,11,600 as against Rs. 14,69,200 the preceding year. The selection method is in force on 75 per cent of the area under working plan, and improvement fellings on most of the balance. The usual tending and cultural operations were carried out. The net revenue dropped from Rs. 11,21,800 to Rs. 9,47,600. Considerable research work was done, particu-

larly in connection with forest nurseries. A summary of the report by the Secretary to the Government is included, together with the usual detailed summaries of all phases of the year's work.—*S. B. Shaw.*

5531. FRICKE. Gedanken aus dem Walde und anderes. [Forest thoughts.] Zeitschr. Forest.- u. Jagdw. 54: 43-54. 1922.—The agitation in favor of forest management under the continuous selection system has brought the high forest system with area regulation into disfavor. The most important factor determining increased yields under the new system is increased soil fertility through adequate protection; there is no reason why this can not be secured under the older system by cultural work, soil preparation, under-planting, etc. The high forest system is still in its infancy and needs improvement, but is capable of being improved. It is not economically desirable to abandon the system, prior to developing it to its fullest capacity; neither is it desirable not to develop the selection system, since only long-time development of each can furnish final conclusions. The author also discusses 2 problems in mensuration in the use of Schwappach's yield tables and Pressler's formula for calculating accretion.—*J. Roeser.*

5532. GEORGI, C. D. V. Note on Minyak Nyatoh (oil from *Palaquium* sp.). Malayan Agric. Jour. 11: 38. 1923.—Particulars are given of this oil, probably from *Palaquium oblongifolium* Burck.; it is a hard white fat which could be used for edible purposes, soap-making, etc.—*R. E. Holttum.*

5533. GEORGI C. D. V. Notes on Kapayang oil. Malayan Agric. Jour. 11: 39-40. 1923.—Oil from seeds of 2 forest trees locally known as Kapayang was examined. One of these is probably *Hodgsonia heteroclita*, the other not known. Neither has been cultivated and nothing can be reported as to commercial possibilities.—*R. E. Holttum.*

5534. GEORGI C. D. V. Oil from *Sterculia* sp. Malayan Agric. Jour. 10: 259-261. 1922.—Analyses are given of oils from kernel and pulp of seed sent from Brunei, used locally as a source of edible oil. The total oil content is 26 per cent of the dry seed, but until larger quantities are available for investigation it cannot be recommended for any specific purpose.—*R. E. Holttum.*

5535. GERRY, ELOISE. Naval stores: treasures of the living pines. Amer. Forest. 29: 72-77. 8 fig. 1923.

5536. GHOSE, T. P. The calorific value of some Bombay and Burma timbers. Indian Forest. 48: 141. 1922.—The heating values in calories and in B. T. U. calculated on wood dried at 100°C. are given for *Cordia myxa*, *Bauhinia variegata*, *Trema orientalis*, *Ficus tuberculata*, *Butea frondosa*, *Hymenodictyon obovatum*, *Zizyphus xylopyra*, *Polyalthia cerasoides*, *Bruguiera gymnorrhiza*, *Ceriops roxburghiana*, *Cynometra ramiflora*, *Excoecaria agallocha*, *Heritiera minor*, and *Rhizophora mucronata*.—*E. N. Munns.*

5537. GRASSET, L. The timber industry in New Caledonia. Australian Forest. Jour. 6: 40. 1923.

5538. GRAY, E. The cork tree. Australian Forest. Jour. 6: 63. 1923.—Characteristics of cork oak (*Quercus suber*) and suggestions for planting it are given.—*C. F. Korstian.*

5539. GREELEY, W. B. Economic aspects of our timber supply. Sci. Monthly 16: 352-361. 1923.

5540. GREELEY, W. B. Wood for the nation. U. S. Dept. Agric. Yearbook 1920: 147-150. 4 illus. 1921.—Arguments are presented for the growing of timber by farmers to help supply the increased demands made by industries upon our forests.—*C. J. Shirk.*

5541. GREEN, A. V. Shelter belts and hedges at Rukura. *New Zealand Jour. Agric.* 26: 133-139. 5 fig. 1923.—Lists of plants which have proved satisfactory and suggestions for plants are given.—N. J. Giddings.

5542. GREENSTREET V. R. Ash from cutch manufacture as a fertilizer. *Malayan Agric. Jour.* 10: 262-263. 1922.—Ash of the residue after tannin extraction from bark of mangrove trees contains 50 per cent lime and 9.6 per cent K_2O and may be of commercial value as a fertilizer.—R. E. Holttum.

5543. GRIFFITH, JEAN P. El pino australiano. [The Australian pine.] *Rev. Agric. Puerto Rico* 9: 13-15. 1922.—The Australian pine (*Casuarina* spp.) has proved successful in Porto Rico under varying conditions of growth and increased plantings are recommended.—John A. Stevenson.

5544. GRIFFITH-BOSCOWEN, ARTHUR, and G. G. LEVESON GOWER. The hundredth report of the commissioners of His Majesty's woods, forests and land revenues. 55 p. London, 1922.—This is the customary annual business report of the management of crown properties, and only incidentally deals with forestry. The income from timber for the year was £40,755, and disbursements on account of planting and preparation of timber for sale were £47,197.—S. B. Show.

5545. GUILLAUME, C. La restauration des taillis dégradés dans le Cantonnement de Beauraing. [The improvement of run-down coppice in the Cantonnement of Beauraing.] *Bull. Soc. Centrale Forest. Belgique* 29: 556-567. 1922.—The following causes have resulted in a deterioration of the coppice: (1) grubbing out stumps; (2) pasturage; (3) short rotations; (4) soil moisture; (5) intemperate weather; (6) south exposures. The work of improvement consists of: (a) changing to coppice with standards; (b) introducing coniferous species in mixture; (c) conversion to pure coniferous stands. Tables are given showing the changes made and the results obtained. A few costs and selling prices are given.—H. T. Gisborne.

5546. GUILLAUME, C. Les mélèzes du Gouverneur. [The Governor's larches.] *Bull. Soc. Centrale Forest. Belgique* 28: 648-650. 1921.—A 60-hectare plantation of European larch is briefly described. The first plantation of about 100,000 seedlings, made 75 years ago, prospered well. Subsequent plantations of the same species on the same land have all failed more or less completely. The reasons are not yet understood.—H. T. Gisborne.

5547. HANSEN, T. S. Forest possibilities of northern Minnesota. *Amer. Forest.* 28: 742-745, 757-758. 5 fig. 1922.

5548. HARRINGTON, C. L. The trail ahead—how to put forestry in Wisconsin on a sound basis. *Amer. Forest.* 28: 712-714. 4 fig. 1922.

5549. HELOUIS et HATIEZ. Essais pratiques d'utilisation des bois de la Côte d'Ivoire. [Attempts to utilize in a practical way the timbers of the Ivory Coast.] *Rev. Bot. Appl. et Agric. Coloniale* 2: 15-22. 1922.—The principal native woods are classified according to weight and density, and under these headings are given the native names, with brief notes on their physical properties and utilization. An appendix to the main article, written by AUG. CHEVALIER, gives a list of the botanical equivalents of these native names. These are as follows: *Alstonia congensis*, *Antiaris africana*, *Aucoumea klaineana*, *Baillonella toxisperma*, *Bridelia speciosa*, *Canarium occidentale*, *Chlorophora excelsa*, *Chrysophyllum* sp., *Cola nitida*, *Coula edulis*, *Dumoria Heckeli*, *Entandrophragma* sp., *Erythrophloeum guineense*, *Fagara macrophylla*, *Funtumia africana*, *Guarea africana*, *Heritiera utilis*, *Khaya* spp., *Klainedoxa* sp., *Mitragyne macrophylla*, *Ochrocarpus africanus*, *Oldfieldia africana*, *Pachypodanthium Staudii*, *Petersia viridiflora*, *Protomegabaria stapfiana* (*Macrobotrya stapfiana*), *Pynaertia occidentalis*, *Rhizophora racemosa*, *Sarcocephalus esculentus*, *S. Pobeguini*, *Terminalia altissima*, *Trichilia Cedrata*, *Triplochiton scleroxylon*, *Uapaca benguelensis*, *Vitex pachyphylla*.—Paul Russell.

5550. HILL, C. L. Fundamental principles underlying kiln drying. *Australian Forest Jour.* 6: 33-38. 1923.—This paper discusses the fundamental principles governing the removal of moisture from wood in kiln drying as studied at the Forest Products Laboratory of the U. S. Forest Service.—*C. F. Korstian.*

5551. HVASS, J. Den af v. Kalitsch anvendte Skovbehandling, dens Fortrin og Mangler. [The forest management of v. Kalitsch, merits and disadvantages.] *K. Vet. og Landbohøjskoles Aarsskr.* 1923: 165-192. *Fig. 1-8.* 1923.—A movement in German forestry from the old rigid system to more natural forms, where the forester merely helps nature, was studied in the "Dauerwald" of v. Kalitsch, in pine woods on diluvial sand in Anhalt. Since 1884 all clear cutting has been abolished, no litter is sold, and the poorest parts are even furnished with litter from other parts. The cutting was first very conservative tending to form trees with 10-14 m. branchless trunks and pointed crowns 6-7 m. high. When this was accomplished the new growth was allowed to appear in groups which, as the cutting proceeded, united to a remarkably regular cover in 20 years. In the Dauerwald the new growth in the shade of the older trees develops slender stems with thin branches and when the light is let in the crowns develop and the diameter growth speeds up. Objections to the Dauerwald are its lack of order and system, the great responsibility on the administrator, the poor guarantee for the future, the difficult and expensive work, and the great damage when the trees are cut.—*Ernst Gram.*

5552. JACOB, W. R. LEG. Note on Bokain (*Melia azedarach*) plantations on Monabari tea estate. *Indian Forest.* 49: 73-75. 1923.

5553. JACOB, W. R. LEG. Note on Bokain (*Melia azedarach*) plantations on Orang tea estate. *Indian Forest.* 49: 76-78. 1923.

5554. JERRAM, M. R. K. *Cedrela serrata* timber. *Indian Forest.* 48: 501-502. 1922.—The wood is free from white ant depredations and offers excellent possibilities for use in white ant regions. The tree grows in moist localities, propagates readily from seed, and may be grown in dense stands on a 50-year rotation.—*E. N. Munns.*

5555. JERRAM, M. R. K. The effect of fire, shade, and injury on the growth of *Pinus longifolia* seedlings. *Indian Forest.* 48: 644-647. *Pl. 20.* 1922.—Partial shade helped the growth of seedlings, while on the burns the tree made a much better growth than in the forest. Wood ashes apparently help, but the real effect is presumably deeper for the growth of trees in the nursery, fertilized with ashes, does not compare with their natural growth. An insect attacks the tree and after the death of the leader coppice growth forms a ring about the root, apparently changing the type of root growth from a fibrous system to a tap-root.—*E. N. Munns.*

5556. KAUTZ. Die Verjüngung der Buche und Fichte im Harz. [The regeneration of beech (*Fagus sylvatica*) and Norway spruce (*Picea excelsa*) in the Hartz Mountains.] *Zeitschr. Forst.- u. Jagdw.* 54: 93-106. 1922.—The possibilities are discussed of securing natural reproduction under pure beech, pure spruce, and mixed stands with usual cutting methods. Mixed stands of beech and spruce are reproduced easily everywhere; beech in pure stands is easily regenerated when the soil is kept in good condition and free of weeds; and pure spruce stands may be regenerated in part naturally without cost; in part, only with cost; in part, only artificially. Beech regeneration is governed primarily by the degree of preparatory and light fellings, since the density of the overstory must be regulated according to the amount of light needed to induce seed production, to keep down advance reproduction, and to protect and encourage the desired reproduction. Spruce sites are classified according to method of reproduction to be used, and a few cultural rules are given. In any case—whether seeding or planting—extensive clear-cutting in spruce should be avoided.—*J. Roesser.*

5557. KIENITZ. *Ergebnis der Versuchsanpflanzung von Kiefern verschiedener Herkunft in der Oberförsterei Chorin.* [Results of experimental plantations of pines of various origin in the forest district of Chorin.] *Zeitschr. Forst.- u. Jagdw.* 54: 65-93. 1922.—In 1907 Scotch pine (*Pinus silvestris*) seed from Scotland, East Prussia, southern France, Belgium, Bavaria (Rhine Palatinate), Courland, Brandenburg, and eastern Russia (Ural) was sown in the Chorin nursery. In 1908, 4 additional lots from Bulgaria, northern Sweden, and northern and western Hungary were sown. Results after 15 years are believed to be representative and reliable for practical application. Racial characteristics were developed during the first year after sowing, and the growth habit was affected by place of origin more than by any other factor. Results indicate that the southwestern German pine is entirely unadapted in the East, and southern German mountain pines do not thrive in northern Germany; that trees of eastern German origin surpass all other races in form and size; and that Belgian trees which showed the highest survival belong at least to the better races. On the basis of average height \times survival, the different races of the 1907 planting ranked as follows: East Prussia, Belgium, Brandenburg, Courland, Rhine Palatinate, Scotland, eastern Russia, southern France. The last was a distinct failure. Of the 1908 sowing only the trees of northern Sweden showed promise. For the extensive introduction of pines extreme caution should be employed to select only such races as give the greatest assurance of developing good form upon the new site. In general, the local variety should be employed, and the use of seed far from its place of origin should depend upon similarity of site conditions. Since desirable forms are mainly heritable, stands should be so guided by proper selection in thinnings, that at maturity only those stems remain which conform to the object of management. For best results seed should be collected only from older stands, absolutely pure of race. Failures due to improper selection (from stands of poor form or from regions too remote from the place of employment) are very common and have discouraged pine culture in many parts of Europe.

—J. Roesser.

5558. KNUCHEL, H. *Quelques impressions sur le Portugal forestier.* [Impressions of forestry conditions in Portugal.] *Jour. Forest. Suisse* 73: 41-45, 65-68, 85-87. 3 pl., 1 fig. 1922.—A general description of topography and climate is followed by a short description of Portuguese agriculture. Two tables show (1) the percentage of forest area compared with idle land and land to put to other uses, and (2) the distribution of the different forest types. The growing "Society of Tree Culture" plays an important political part. Portugal has an excellent basic forest law, enacted in 1901 and 1903 and enforced by a far sighted and conscientious forest personnel. All receipts of the forests on the public domain may be paid into a special fund to be used exclusively for forestry purposes other than salaries. The forests are classified according to whether their administration by the State is obligatory or optional.—The law of 1901 established a branch of forest management and one of forest research. An amendment in 1911 created a special fund for general forest inspection and the annual recognition of parish-schoolmasters of merit in any branch of forestry. Under the new forest laws great strides have been made by the State in land acquisition, afforestation, reforestation, road construction, and communal cooperation. The communes have themselves accomplished very little.—The distribution of forest species is summarized into the northern and southern groups. The characteristics, management, and utilization of maritime pine, the most important timber species, are briefly related. Other species are mentioned, especially cork oak.—An outline is given of the forestry organization headed by a director general and comprising the 4 offices of management and research, planting, administration, and finance. The extent of state forests including the areas planted in the mountains and along the coast is given.—The park at Bussaco, embracing 102 hectares, is not only of botanical interest to foresters, but also contains the only primeval forest of indigenous trees and shrubs left in Portugal. There are plantations of introduced species of *Abies*, *Picea*, and *Fagus*, a few splendid specimens of *Cupressus lusitanica* 270-300 years old and many of *Sequoia sempervirens*.—The State has been aggressive and successful in the afforestation of dunes and dried up marshes, obtaining good results especially with *Eucalyptus*, *Pinus maritima*, and *P. insignis*. To date, however, the State has not taken energetic steps in reforesting denuded mountain areas.—G. Kempff.

5559. KRAUCH, HERMANN. Nursery and planting methods developed at the Gallinas nursery, Santa Fe National Forest. *Nation. Nurseryman* 31⁶: 125-128. 7 fig. 1923.

5560. LEETE, F. A., ET AL. Report on forest administration in Burma for the year ending June 30, 1920. ii + 202 p. Rangoon, 1922.—This is the usual annual report covering the activities of the Forest Department. A review of the more important phases of the work by the Chief Conservator is a feature. Rapid progress was made in reserving forests. At present only 29,874 square miles, or 20 per cent of the forest area, is reserved; the balance is unclassified. In the future, forests for local purposes as well as for timber will be reserved, a radical departure from past policy. Little was done in preparation of new working plans, though it is known that much is required and most existing plans are out of date. Minor species are not sufficiently recognized in the older plans. Natural reproduction was generally poor. Artificial reproduction has now covered 100,400 acres,—5,896 acres, largely teak, having been added during the year. Forest offences rose from 5,414 to 7,152, with the certainty that not all were reported. It seems probable that teak can be produced in a 60-year rotation by taungya regeneration as large as that grown in 180 years under natural conditions. Fire protection was attempted on 859,600 acres and 70,300 acres burned over during the year. Progress was made in construction of communications, but the province is still backward and exploitation is seriously hampered by lack of roads. The outturn of timber was 100,775,000 cubic feet, largely teak. Demand and prices were good. Minor produce rose in value to 11.26 lakhs and gross revenue was 165.67 lakhs,—36 lakhs more than the previous year. Departmental exploitation was commonly employed as in the past. A provincial research circle was created, and serious efforts were made to study the many forest species in the province. The usual detailed tabular summaries of receipts, expenditures, grazing, fire, exploitation, etc., are included.—*S. B. Show.*

5561. LEETE, F. A., ET AL. Report on forest administration in Burma for the period July 1, 1920, to March 31, 1921. 202 p. Rangoon, 1922.—This is the customary annual report dealing with all phases of the work of the Forest Department. A comprehensive review of important points by the Chief Conservator, and a summary by the Secretary to the Government are features. The reservation of forests for local use proceeded slowly due to both inadequacy of surveys and misguided opposition of the local population. It was found that many working plans are not being followed in practice, and while the need for new and revised plans is great, the tendency to regard all of the older plans as worthless is unfortunate. Greater attention was given to research, a special officer having been appointed, and much new work was undertaken. Taungya plantations, chiefly of teak, amounted to 5,500 acres in the year. This is an important method of regeneration, avoiding many of the difficulties of natural reproduction. An economic survey is proposed to determine the available supply of various timbers. Expenditures on communications and buildings totaled Rs. 2,33,354, and good progress in this work is reported. Breaches of forest rules totaled 6,140 for the 9 months. Fire protection was attempted on 445,870 acres, of which 116,007 acres burned. On the reserved forests 22,808 square miles were closed to grazing and 7,126 were open wholly or in part. The amount of teak cut was 322,660 tons, greater than in the entire preceding year, and 241,290 teak trees were girdled. The increased use of teak is regarded as dangerous because the present supply will decrease until plantations are ready to exploit. The total area of plantations is now 102,425 acres. Revenue and surplus continued to increase, being respectively 168 and 108½ lakhs as compared with 166 and 102½ lakhs the preceding full year. Teak is the backbone of forest revenue, accounting for 129 lakhs. The successful operation of the provincial forest school continued. The usual detailed tabular statements of the operation of the Department are included.—*S. B. Show.*

5562. LITTLEWOOD, A. C. Effect of poisoning sandal seeds on germination. *Indian Forest*. 48: 188-189. 1922.—Experiments on sandal seed show that neither perchloride of mercury nor the red oxide of mercury were effective rodent deterrents as the seed was freely taken. No treated seed germinated, but as no checks were made it is not known whether the seed was affected by the poisons.—*E. N. Munns.*

5563. LOVEJOY, P. S. Michigan's fight for forests. Amer. Forest. 28: 749-753. 4 fig. 1922.

5564. LOVEJOY, P. S. The need for a policy for the cutover lands of Michigan. Rept. Michigan Acad. Sci. 22: 5-7. 1920.

5565. MILWARD, R. C. Annual progress report on forest administration in the Presidency of Bengal for the year 1920-21. 47 p. Calcutta, 1921.—The report covers a 9-months period. The area under administration remained at 10,698 square miles, or 13 per cent of the area of the province. Working plans were revised for 46 square miles of forest. During the year 105 miles of new trails were constructed. Of 424,000 acres on which protection from fire was attempted, only 1.3 per cent burned. It was found necessary to fence plantations in order to prevent damage by wild cattle. Fungi and insects also required constant attention. Natural reproduction of desirable species continued unsatisfactory and much work was done in tending, cultivating, and protecting natural reproduction. Taungya plantations were established on 179 acres. Of the area under working plan 65 per cent has unregulated felling and 17.6 per cent improvement felling. Departmental operations accounted for 4 per cent of the timber and 22 per cent of the minor produce. The amount of sale and extraction was about the same as the previous year. A greater percentage of the expenditures was for capital investment, since it is recognized that greater investment in roads, communications, etc., is necessary if the forests are to be handled at maximum utility and profit. The net income for the period was Rs. 6,71,600, compared to Rs. 9,47,600 for the entire preceding year. A summary of the report by the Secretary to the Government is appended, with detailed tabulations of all phases of the Department's work.—S. B. Shaw.

5566. MÖLLER. Zusätze zur "Betriebsregelung im Dauerwalde." [Addendum to "Management regulation in the continuous forest."] Zeitschr. Forst.- u. Jagdw. 54: 22-25. 1922.—Comments are made on Wendroth's article [see Bot. Absts. 12, Entry 5593]. Better knowledge is necessary of the quantity, increment, and value of the growing stock than is now had. The purpose of management in the continuous forest is to establish a definite, continuous, maximum yield, this to be secured gradually by means described by Wendroth. There is no fixed rotation under this silvicultural system, as the subject of management is not the stand but the individual tree. No thrifty growing trees are removed; if necessary, the growing stock is increased to take care of future needs; and the determination of the yearly cut must assure continuity of use.—J. Roeser.

5567. MOREILLON, M. Les forêts sont-elles vraiment protégées par les oiseaux? [Are the forests really protected by birds?] Jour. Forest. Suisse 73: 81-82. 1922.—Birds are often quite impotent in checking sudden insect invasions and the author believes that they are not of such importance as nearly all who are interested in this question believe. He argues that birds are plentiful wherever they normally find an ample food supply, and *vice versa*. During the invasion in 1921 of *Dasychira pudibunda* into the forests in the vicinity of Count Berlepsch's "Station for Bird Protection," at Seebach, the forested bird sanctuary suffered very little; but if the birds are numerous there it is due to the fact that this forest is surrounded by meadows and fields, and that the "efficient protective organization" contributed to the result in an entirely secondary way.—G. Kempff.

5568. PERRY, W. J. Indian peeling in western yellow pine. Amer. Forest. 29: 38. 1 fig. 1923.—In northern New Mexico the Navajos and other Indians cultivated patches of corn along the lower valleys of the mountain streams. Also, a substitute breadstuff was prepared from the inner bark or cambium of pine trees. The outer bark was peeled with stone hatchets and the inner bark removed, dried, and roughly ground. The peeling was done in early summer. The operation did not seriously injure the trees, as a photograph of a tree three-fourths girdled in 1852 indicates.—Chas. H. Otis.

5569. PINCHOT, GIFFORD. Outlook for forestry in Pennsylvania. Amer. Forest. 29: 19. 1 fig. 1923.

5570. POLLET, J. Le gibier et la forêt. [Game and the forest.] Bull. Soc. Centrale Forest. Belgique 29: 603-612. 1922.—The ways in which abundance of game is favored or hindered through the practice of forestry are described; e.g., the present tendency toward large dense stands of spruce is highly unfavorable to deer; Scotch pine is better than spruce, and mixed stands are still better as they permit the growth of vegetation palatable to deer. By handling certain small areas in such a manner as to favor the various kinds of game the sport and profit of hunting can be maintained.—H. T. Gisborne.

5571. PREUSS, WILHELM. Bäume als Blitzableiter. [Trees as lightning conductors.] Illus. Landw. Zeitg. 42: 254-256. 1922.—Oak, linden, ash, and especially poplar suffer more frequently from lightning than do elm, birch, and beech. The writer gives reasons for believing the relative susceptibility of different genera is not due to differences in chemical content, location, soil, or root systems. Evidence is adduced to show that one species is as likely to be struck by lightning as another but that the trunks and large branches of poplars and oaks are damaged most often because their wood is more easily split. Many beeches are struck without perceptible injury. Smooth barked trees like beech are less easily injured than rough barked oak and poplar. Trees near buildings are not a lightning menace, but may be a protection as lightning conductors. Old, valuable, and favorite trees should be protected with lightning conductors.—John W. Roberts.

5572. R., E. Le prix des bois. [The price of wood.] Bull. Soc. Centrale Forest. Belgique 29: 625-627. 1922.—The price of wood, now high, has not yet reached its peak. Several lots of spruce at Eupen brought an average of 91.50 francs per cubic m. on the stump. Prices varied according to the size of the average tree. Prices are quoted for several other species at Bullange and Eupen.—H. T. Gisborne.

5573. RAU, MADYAR GOPAL, and JOHN LIONEL SIMONSON. Oils and fats from the seeds of Indian forest trees. Parts 1-5. Indian Forest Rec. 9³: 95-109. 1922.—A preliminary account is given of the yields, and chemical and physical properties of a number of new oils and fats extracted from native tree seeds. *Chloroxylon swietenia* seed yield 16 per cent of a non-drying oil of no present economic value. The seed of *Calophyllum wightianum* yields 34 per cent of an oil which is used as an illuminant. Seed from *Mimusops elengi* furnish 16 per cent oil which, unlike that of the African species of the genus, can not be used for culinary purposes. *Shorea robusta* seed yield 16.4 per cent of a fat resembling tallow; the percentage is too low for utilization. *Garcinia cambogia* seed yielded 31 per cent fat, which is edible and of possible economic importance.—E. N. Munns.

5574. REGINSTER, G. Le dessouchement par explosifs. Les essais dans la forêt de Hertogenwald. [Removing stumps by use of explosives. Experiments in the Hertogenwald.] Bull. Soc. Forest. Belgique 29: 582-585. 1922.—Detailed costs are given for an experiment in stumping land by use of explosives. No market was found for the material removed and the costs were deemed excessive.—H. T. Gisborne.

5575. ROBERTSON, W. A. Note on Gurjun or Kanyin. Forest Bull. [Calcutta] 50. 7 p. 1922.—This wood includes 6 species of *Dipterocarpus*, *D. turbinatus* and *D. alatus* being the most important. They occur in the evergreen forests of Assam, Burma, and the Andamans, tending to form pure patches. They are found principally at the lower elevations on dry sites. Trees 120 feet high and 10-15 feet in girth with 60-80 feet of clear length are not uncommon. The properties of the wood are described. It is not durable, but is extensively used for flooring and, when treated, for railway sleepers. A good oleo-resin is yielded. Data on costs of extraction in various localities are given. The present growing stock in Burma is estimated at 6 million tons, of which $\frac{1}{4}$ is of trees 9 feet or over in girth.—S. B. Show.

5576. RODGER, A. **Note on Thingan (*Hopea odorata* Roxb.).** Forest Bull. [Calcutta] 49. 15 p. 1922.—The tree is found in Lower Burma and the Andamans, and has probably 8 varieties. It grows up to 150 feet high and 12 feet in girth with clear logs 40–80 feet in length. It is nowhere abundant. The properties of the wood are described. It is especially valuable for boat building, and in its range is regarded as one of the most valuable native species. The tree yields a resin, which is described in detail. The species reproduces readily, but seed can not be stored. It appears to do well even when growing under adverse conditions.—*S. B. Show.* *

5577. RODGER, A. ***Pinus Merkusii*.** Indian Forest. 48: 502–504. Pl. 13. 1922.—The Merkusi pine is found in the upper valleys dividing Burma and Siam, usually on poor soils where it makes a fair growth. On good soils it is a tree of 36 inches diameter and 100 feet height at 100 years. Fire is very destructive to seedlings and reproduction is usually scanty. A heavy yield of resin is secured.—*E. N. Munns.*

5578. SCHOTTE, GUNNAR. **Redogörelse för Skogsförsöksanstaltens Verksamhet under Fyraårsperioden 1918–1921 Jämte Förslag till Arbetsprogram.** [Report of the Swedish Forest Experiment Station for the 4-year period 1918–1921.] Meddel. Statens Skogsförsöksanst. 19: 1–123. 1922.—The report gives a brief survey of organization, personnel, and expenditures, followed by discussions of the various lines of work. These discussions cover the field from the administrative rather than the technical point of view. The general program for the 4-year period 1922–1926 contemplates investigations under the following heads: (1) forest regeneration; (2) development of stands; (3) diseases and injuries; (4) races of trees and acclimatization of foreign trees in Sweden; (5) forest soils. Summaries of the program are given in German and English.—*G. A. Pearson.*

5579. SCOTT, A. H. **Massachusetts state forest from an old estate.** Amer. Forest. 29: 108–110. 7 fig. 1923.—The Whitney estate in the Berkshire Hills, recently acquired as a part of the state forests of Massachusetts, is described.—*Chas. H. Otis.*

5580. SEAMAN, L. N. **Further report on tests of hammer handles made of Indian woods.** Indian Forest. 48: 543–547. 1922.—More complete data are given on laboratory tests of the static and impact bending of 3 Indian woods. [See also following entry.]—*E. N. Munns.*

5581. SEAMAN, L. N. **The suitability of certain Indian woods for hammer handles.** Indian Forest. 48: 175–181. Pl. 10–11. 1922.—Laboratory tests of the wood of *Terminalia tomentosa*, *Dalbergia sissoo*, and *Olea ferruginea* show that these supposedly inferior woods are suitable for handle stock. [See also preceding entry.]—*E. N. Munns.*

5582. SIMONSON, JOHN LIONEL, and MADYAR GOPAL RAU. **The constituents of some Indian essential oils. Parts 1–7.** Indian Forest Rec. 9³: 111–146. 1922.—The essential oils from the oleoresin of *Pinus khasya* and *P. excelsa*, and the essential oils from *Cedrus deodora*, *Andropogon juarancusa*, and from the seeds of *Zanthoxylum alatum*, *Z. acanthapodium*, and *Z. budrunga* were obtained by distillation and subjected to chemical analysis. The methods employed are described. All of these oils are likely to prove of economic value. The resins from the pines are as good as those from the American *Pinus palustris*.—*E. N. Munns.*

5583. SMITH, HERBERT A. **How the public forests are handled.** U. S. Dept. Agric. Yearbook 1920: 309–329. 10 illus. 1921.—The difficulties, duties, and aims involved in grazing, lumbering, and protection of public forests are presented in popular style.—*C. J. Shirk.*

5584. SMYTHIES, E. A. **Calculation of the yield of a forest by formulae.** Indian Forest. 48: 626. 1922.—The standard formulae for yield fail under Indian conditions because of the species and sizes. A modified formula with a changed basis of volume to take care of both

the timber crop and the "small-wood" is worked out. V in the present case represents the volume of trees of age x and over with the proviso that both measurements and volumes per tree are taken to the same diameter, i.e., to the diameter of a crop or average tree of age x . In the United Provinces this diameter is invariably 8 inches, so that for any species or forest, as soon as the age of an 8 inch crop or average tree is known, the modified formula can be applied. The methods of deriving the formula are given in detail.—*E. N. Munns.*

5585. SMYTHIES, E. A. Distribution of age and diameter classes in a normal selection forest. *Indian Forest*. 49: 66-69. *Pl. 4*. 1923.—The calculation for a stand of sal of second class quality is given, showing the normal distribution of the various diameter classes, and the volume of wood per acre in the different classes.—*E. N. Munns.*

5586. TH., J. La preparation forestiere de la defense nationale. [Forestry preparation for the national defense.] *Bull. Soc. Centrale Forest. Belgique* 29: 673-676. 1922.—The article deals with the role of forests in concealing the movements of troops, hindering the enemies' movements, and supplying needed materials. The restocking of certain areas is pointed out as urgently necessary for military purposes alone. Attention is called to the importance and value of the forest service personnel in time of war.—*H. T. Gisborne.*

5587. TIEMANN, H. D. The Australian bush. *Amer. Forest*. 29: 87-90. 6 fig. 1923.—Australia has less than 5 per cent of forested land and less than 2 per cent of merchantable timber. The predominant tree is *Eucalyptus*, with 283 species. Next in number of species come the wattles, or Acacias, of which there are at least 250. The forests as a whole are very deficient in softwoods. There are 11 indigenous genera of conifers. A most striking feature of the forests is the undergrowth of tree ferns, which are sometimes 25 feet in diameter and often several hundred years old. The mountain ash (*Eucalyptus regnans*) is probably the largest tree in Australia, one 347 feet high being reported in the Dandenong Mountains. A good stand of millable timber runs 30-50 thousand board feet per acre.—*Chas. H. Otis.*

5588. TODD, F. H. Supplementary research report of Assam. *Indian Forest*. 49: 69-73. 1923.—Of 752 square miles of forest surveyed, only 22 were in classes I and II. The balance is of doubtful economic value. Extensive planting is necessary to secure desirable stocking. Firewood timber is almost exhausted in some places. The supply of simul (*Bombax malabaricum*) for tea shooks is sufficient to fulfill the demand indefinitely.—*E. N. Munns.*

5589. TRESCKOW, VON. [Rev. of: HEDLER, WALTER. Deutschlands Forst- und Nutzwirtschaft in und nach dem Weltkrieg. [Germany's forest and timber management during and after the World War.] 119 p. Leipzig, 1921.] *Zeitschr. Forst.- u. Jagdw.* 54: 38-43. 1922.—Hedler was in charge of wood products under the War Department, and is well versed in the theory of forest politics. His book is valuable as a statistical reference. That portion, however, dealing with state control of wood prices, and of cutting and management upon private holdings can not go unchallenged by technical foresters. Hedler's idea regarding state control of forest product prices is impractical. He suggests state control of cutting and the utilization of Germany's forest reserve upon economic grounds, ignoring the fact that the forest reserve is too valuable to be used up during a temporary emergency. Socialization must be avoided, since the success of forest management has been mainly due to uninterrupted private endeavor. Only a little state help (e.g., a strict reforestation control on small holdings) is necessary in order to bring private forests to maximum production.—*J. Roesser.*

5590. TROTTER, H. Development of bamboos from natural seedlings. (*Dendrocalamus strictus*.) *Indian Forest*. 48: 531-536. 1922.—In 11 years natural seedling bamboos formed clumps of exploitable size and required thinning. Largest culms are 40 feet in height and 5.5 inches in girth. The only protection given them was from grazing.—*E. N. Munns.*

5591. VENDELMAN, HENRY. *Le pin de Banks*. [*Pinus banksiana*.] Bull. Soc. Centrale Forest. Belgique 28: 603-606. 1921.—*Pinus banksiana*, which was in great favor for many years in Belgium, is now being severely criticised. The present article is a defense of the species.—*H. T. Gisborne*.

5592. WALLACE, H. C. *Forestry and our land problem*. Amer. Forest. 29: 14-18. 6 fig. 1923.—Some ideas of the Secretary of Agriculture as to what should go into the U. S. A. forestry program are presented.—*Chas. H. Otis*.

5593. WENDROTH. *Betriebsregelung im Dauerwalde*. [Management regulation in the continuous forest.] Zeitschr. Forst.- u. Jagdw. 54: 11-22. 1922.—The author describes and illustrates a plan of regulation based upon the Möller form of continuous management. Its object is to furnish at all times a survey of the growing stock and the increment of the stand and to provide for continuity of management. Regulation is by volume; governed by growing stock and increment; regulation by area in mixed stands can not be considered practicable or even possible. The working plan includes map and description of stand; tally of yearly cut by species, tally of yearly cultural and planting work and costs, and a statement of actual growing stock and increment for certain periods, the increment being calculated for 5 or 10-year periods in advance; and a tabulation of average diameters for calipered stands as an indication of the movements in value increment of the growing stock. Stands above 20 cm. in average diameter are actually calipered for volume; for those between 7 and 20 cm., volumes are computed from Schwappach's 1896 yield tables for pine.—*J. Roeser*.

5594. WILBRAND. *Nutzholzzucht*. [The production of timber.] Zeitschr. Forst.- u. Jagdw. 54: 175-180. 1922.—The author asks whether the present silvicultural systems are in harmony with the demand for maximum quantity and quality production. Long, straight-boled trees are demanded for the production of timber, and these are best secured by permitting trees to grow in pure, undisturbed stands until the completion of their natural height growth. When this age is reached thinnings should remove all material which touches or interferes with the crown development of the desirable timber-producing trees. At the same time an understory, preferably of red beech, should be introduced to secure full utilization of the site. Removals (thinnings or light cuttings) are to be made whenever necessary to keep the main stand absolutely free. This system applies to all the common hardwoods and softwoods and especially to ash and pine. By this method beech, heretofore managed for fuel wood production, is gradually being converted into a valuable timber tree. The important task for foresters is to determine the time when height growth ceases and diameter growth begins, by locating sample trees and securing measurements of merchantable length and total height. These will afford a basis for putting into effect this system of management.—*J. Roeser*.

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 5290, 5337, 5341, 5342, 5346, 5430, 5433, 5434, 5436, 5442, 5444, 5449, 5483, 5490, 5557, 5657, 5665, 5753, 6036)

5595. ANONYMOUS. *Biometry and genetics*. Nature 111: 513-514. 1923.

5596. ANONYMOUS. [German rev. of: VILMORIN, JACQUES DE. *Croisement entre pois à valves colorées et pois à valves vertes*. (Crosses between peas with colored pods and peas with green pods.) Compt. Rend. Acad. Sci. Paris 172: 815-817. 1921 (see Bot. Absts. 10, Entry 137). Zeitschr. Pflanzenzucht 8: 443. 1922.

5597. BAUR. [German rev. of: KAUP, F. *Volkshygiene oder selektive Rassenhygiene?* (National hygiene or selective race hygiene?) 170 p. Hirzel: Leipzig, 1922.] Arch. Rass.- u. Ges. Biol. 14: 434-436. 1923.

5598. BHATIA, B. L. On the significance of extra contractile vacuoles in *Paramecium caudatum*. Jour. Roy. Microsc. Soc. London 1923: 69-72. 3 fig. 1923.—The presence of extra vacuoles is considered a case of reversion to an ancestral condition, in which there was a linear series of vacuoles.—R. E. Cleland.

5599. BLARINGHEM, L. Héritéité des caractères physiologiques chez les hybrides d'Orges (deuxième génération). [Heredity of the physiological characters in the barley second generation hybrids.] Compt. Rend. Acad. Sci. Paris 175: 230-232. 1922.—Second generation hybrids between *Hordeum nudum* L. and *H. trifurcatum* Schlecht are found to inherit: 1. the awned and hooded characters in the ratio of 2.85:1-(123 hooded :49 awned); 2. The offspring produced both 2 and 6 rowed spikes and intermediates. The 123 hooded plants produced 48 2-rowed, 36 intermediate, and 39 6-rowed plants. The 49 awned plants produced 26 2-rowed, 6 intermediate, and 17 6-rowed plants. 3. The compactness of the spikelets and proliferations is found to be a complex situation which gives a wider "spread" in the 2nd generation than the original parents had. The conclusion reached is that ornamental and superficial characters (such as awns) are transmitted according to Mendel's law, but the physiological characters essential to increased production (such as fertility of the spikelets) are transmitted through a cellular structure which is a mosaic. The author believes that the selection of varieties for increased yield is quite different than the segregation of characters as conceived by the Neo-Mendelians.—J. A. Faris.

5600. BLARINGHEM, L. Nouveaux faits relatifs aux hybrides de blés et d'aegilops. [New facts relative to wheat and aegilops]. Compt. Rend. Acad. Sci. Paris 176: 852-854. 1923.—During the seasons of 1919-1922 crosses were made between varieties of various species of wheat with the object of obtaining information on the fertility in rather wide crosses. Following are the results obtained: *Aegilops* × *Haynaldia villosa* gave no seed and the ovaries were not visibly affected; *Aegilops* × *Secale cereale* resulted in inflated ovaries but no seed was produced; *Aegilops ovata* × *Triticum spelta* gave inflated ovaries but no viable seed; *A. ovata* × *T. vulgare* resulted in 1 viable seed; *A. ovata* × Petanielle de Nice (a *T. vulgare* × *T. durum* hybrid) yielded 4 seeds; *A. ventricosa* × *T. spelta* produced 9 seeds; *A. ventricosa* × a monococcum × durum hybrid gave 13 seeds (all heads produced seed). Percentages of seed set are not given.—J. B. Harrington.

5601. BLUHM. [German rev. of: KOSTITCH, A. Action de l'alcool sur les cellules semi-nales. (Action of alcohol on germ cells.) Internat. Zeitschr. gegen Alkoholismus 1: 53-70. 1922.] Zeitschr. Indukt. Abstamm.- u. Vererb. 30:336. 1923.

5602. BONNEVIE, KRISTINE. Zur Analyse der Vererbungsfaktoren der Papillarmuster. [Analysis of the genetic factors of "finger prints."] Hereditas 4: 221-230. 5 fig. 1923.—Considerable difficulty has been experienced in attempting to classify the various arrangements of papillary ridges revealed in ordinary finger prints, but fairly satisfactory results are obtained by giving each finger a numerical index determined by the number of ridges between the delta and the centrum and then assigning the individual a designation, his "quantitative value," based on the sum of the indices of all 10 digits. When the index numbers run from 0 to 10 the quantitative values have a possible range of from 0 to 100. An examination of about 200 subjects distributed among several families shows that when the individual quantitative values are plotted the resulting curve does not differ widely from the binomial curve, but a closer analysis shows that each person has his own peculiar "value" around which the values for his individual digits are grouped. Further, the two 0 individuals found were brothers, 2 with indices between 90 and 100 were related, and in other cases family resemblances were noted, particularly in the case of twins. Analysis of these family histories and of 24,518 additional individual records leads to the conclusion that the friction ridge pattern is conditioned by several, perhaps 5, pairs of hereditary factors.—C. H. Danforth.

5603. BRIMHALL, DEAN R. **Family resemblances among American men of science. III. The influence of the nearness of kinship.** Amer. Nat. 57:137-152. 1923.—A study is reported of the relatives of individuals whose performances are of such an order that their life histories become of public interest. The brother of a man of science is twice as likely to be distinguished as the father; he attains eminence 4 times as often as an uncle, and 6 times as often as a cousin. Direct offspring are distinguished 3 times as frequently as nieces and nephews. Paternal and maternal influences have about the same weight in biological and—what might not have been suspected—in social inheritance as well.—*C. H. Danforth.*

5604. CLAUSEN, J. **Stedmoderblomstens Variation.** [The variation of *Viola*.] Nat. Verden 7: 218-236. Fig. 1-5. 1923.—A popular extract is given of the author's paper in Botanisk Tidskr. [see Bot. Absts. 12, Entry 3147.]

5605. CLAUSEN, R. E., and T. H. GOODSPEED. **Inheritance in *Nicotiana Tabacum*. III. The occurrence of two natural periclinal chimeras.** Genetics 8: 97-105. 1 pl. 1923.—The origin of 2 flower color bud variations in F_1 hybrids between varieties of *N. Tabacum* is described. In both cases the seed progeny of the normal and the variant were identical. In 1 case the variant type was propagated by cuttings, and root cuttings from such plants produced the normal type. The authors conclude that in both cases the variant type was a periclinal chimera consisting of an unchanged central cylinder enveloped in a mutated dermatogen.—*R. E. Clausen.*

5606. CORRENS, C. **Alkohol und Zahlenverhältnis der Geschlechter bei einer getrenntgeschlechtigen Pflanze.** [Alcohol and relative number of male and female plants with a dioecious plant.] Naturwissenschaften 10: 1049-1052. 1922.—Treating the pollen of *Melandrium* with alcohol vapor for periods of 40-60 minutes gave 15.92 per cent \pm 1.72 more male plants than female than did the control where the pollen was untreated. In explanation of these results Correns thinks that there is a difference in the resistance of the male over the female determiners in that the latter are more easily injured by the treatment with alcohol.—*Orton L. Clark.*

5607. DAHLBERG, GUNNAR. **Twins and heredity.** Hereditas 4: 27-32. 1923.—Assuming that sex is determined at fertilization and the normal sex ratio is approximately 1:1, the number of twins which are of uniovular origin may be determined for any group of statistically adequate size by subtracting from the total number of pairs a value equal to twice the number of those in which the members are of different sex. This method, first employed by Weinberg, is essentially sound, and when applied in connection with adequate family pedigrees leads to the conclusion that there is an hereditary factor in uniovular as well as in biovular twinning. Weinberg had regarded the inheritance of uniovular twinning as unproved; many authors, not including Davenport, have regarded it as disproved. But an analysis of the previously reported data shows that uniovular twinning is probably more frequent among the relatives of uniovular twins than among other classes.—*C. H. Danforth.*

5608. DILLA, HARRIETTE M. **Control of parenthood in relation to eugenics.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 267-271. Williams & Wilkins Co.: Baltimore, 1923.—A discussion is presented largely in the form of questions, of negative and positive eugenics and birth control.—*Orland E. White.*

5609. DUDGEON, WINFIELD. [Rev. of: SCHAFFNER, JOHN H. **Control of the sexual state in *Arisaema triphyllum* and *Arisaema Dracontium*.** Amer. Jour. Bot. 9: 72-78. 1922. (see Bot. Absts. 11, Entry 4692).] Jour. Indian Bot. 3:120-121. 1922.

5610. ELLINGER, TAGE. **The variation and inheritance of milk characters.** Proc. Nation. Acad. Sci. [U. S. A.] 9: 111-116. 1923.—The writer has had the opportunity of studying the records of a large herd of Red Danish and Jersey cattle and their crosses. He finds that the length of the lactation period is almost wholly determined by the time of successful breeding

for the next calf and thus only slightly if at all by innate factors. He reaches the conclusion: "Taking every pro and contra into consideration, it is the conviction of the writer that the first 10-week section (2nd to 11th week) of the first lactation period best displays the genetic variations and therefore at present is the most reliable measure of a cow's milk yielding ability, though not an ideal one." Considerable differences were found between Jerseys and Red Danish in milk production, butterfat percentage (both with respect to average and to the curve of change during the lactation period) and butterfat production. As to inheritance he concludes: "There is no doubt that the mode of inheritance of milk characters falls in that group of inheritance phenomena to which the term blending has been assigned. The treatment of the material fails to disclose the action of any single Mendelian factor. There is no significant difference in the variability of the different genetic groups. The heterozygosity of the parental breeds and the probable complexity of the characters fully account for this."—*Sewall Wright*.

5611. F., E. Comment transformer les carottes blanches en carottes rouges. [How to transform white carrots into red.] Nat. Canadian 49: 58-60. 1922.—An attempt is made to indicate what has been done by cultivation and especially by selection. Reference is made to the work of Vilmorin, Joigneaux, Decaisne, and Labergerie—the last working on *Solanum commersoni*.—A. H. MacKay.

5612. FRIMMEL, F. Notiz über Dominanzverhältnisse bei Fuchsienbastarden. [Note on dominance relations in *Fuchsia* hybrids.] Indukt. Abstamm.- u. Vererb. 24: 279-281. 1920.—The hybrids between *Fuchsia corallina* and Molesworth, a form of the so-called *Fuchsia hybrida* Hort., were compared with the parents and the following resemblances noted: They resembled the *F. corallina* parent in having young shoots and petioles red, the veins of the leaf red on top, and the corolla violet. They resembled Molesworth in having hairy branches with a squarrose habit, veins green beneath, corolla double, and of same length. They were intermediate in 3 characters. The author proposes an unverified hypothesis to account for the veins of the hybrid resembling *F. corallina* in respect to the color of the upper surface and Molesworth in respect to the lower.—L. L. Burlingame.

5613. FRUWIRTH, C. Handbuch der landwirtschaftlichen Pflanzenzüchtung. [Handbook of agricultural plant breeding.] Vol. 5. 2nd ed., x+272 p., 50 illus. Paul Parey: Berlin, 1923.—In this volume the breeding of various plants is treated by different specialists, as follows: Oil palm, coconut, and date, HUBERT WINKLER; rice, J. E. VAN DER STOK, L. KOCH, C. FRUWIRTH; sweet potatoes, E. DE WILDEMAN; sugar cane, peanut, cassava, J. E. VAN DER STOK; citrus, HERBERT J. WEBBER; tea, C. P. COHEN STUART; coffee, J. S. CRAMER, P. C. VAN DER WOLK; cacao, cola, F. W. T. HUNGER; olive, L. TRABUT; castor bean, ORLAND E. WHITE; cotton, GEO. F. FREEMAN; sisal, sorghums, millet, kapok, C. FRUWIRTH; *Hibiscus cannabinus*, H. sabdariifa, sesame, sunn-hemp (*Crotalaria juncea*), jute, (*Corchorus olitorius*), and *Corchorus capsularius*, A. HOWARD; *Cinchona*, C. SPRUIT. Rubber plants are discussed and miscellaneous notes given.—C. V. Piper.

5614. GAINES, E. F. Genetics of bunt resistance in wheat. Jour. Agric. Res. 23: 445-479. 3 pl., 2 fig. 1923.—Crosses of resistant \times resistant, resistant \times susceptible, and susceptible \times susceptible wheats were made and the F_3 generations tested for resistance to bunt (*Tilletia Tritici*) by inoculating the seed with the maximum spore load and planting in the field. The following conclusions were reached: (1) The most susceptible wheats produce about 80 per cent of bunted heads; the 20 per cent of sound heads seem to escape infection by accident. (2) Forty Fold, Red Russian, and Marquis varieties have dilute resistance which reduces the amount of bunt 20-25 per cent. When added together, as in descendants of crosses between them, a concentrated resistance with a value of 30-60 per cent is secured. Marquis wheat has a strong winter-sensitive resistance with a value of 50-60 per cent in spring-sown grain which is ineffective in preventing bunt when the seed is fall sown. (3) Turkey, Florence, and Alaska have differing concentrated resistance which reduces the amount of

bunt 70-75 per cent, compared with the standard susceptible varieties. These concentrated resistances are also cumulative in effect when brought together by crossing, the resulting descendants segregating into immune, very resistant, various stages of dilute resistant, and completely susceptible classes.—*J. A. Faris.*

5615. HARVEY, F. H. Egg-laying tests at Hawkesbury Agricultural College. Twenty-first year's results, 1922-23. *Agric. Gaz. New South Wales* 34: 357-368. 3 pl. 1923.—Egg production and weight of eggs are given for various breeds.—*L. R. Waldron.*

5616. HOWE, LUCIEN. Inheritance of eye defects. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 191-194. Williams & Wilkins Co.: Baltimore, 1923.—Inherited eye defects are discussed. Guyer's recent work on rabbits is reviewed in detail.—*Orland E. White.*

5617. KAMMERER, PAUL. Breeding experiments on the inheritance of acquired characters. *Nature* 111: 637-640. 1923.—This article refers to *Salamandra*, *Alytes* and *Ciona*.—*O. A. Stevens.*

5618. KIESE, H. Blütenveränderungen an Rosen. [Flower changes in roses.] *Möllers Deutsch. Gärt. Zeitg.* 38: 101. 1923.—A Marechal Niel rose was cut back closely. Strong shoots were developed which in the 1st year produced glaucous (meergrüne) roses. When budded they produced, however, the normal yellow flowers. A strong twig of Perle des Jardins produced apically a flower stalk with stamens only. This was budded and showed reversion to the normal flower. The same sports may occur on certain varieties in different situations, as is the case with Souvenir d'un Ami. The light yellow sport of Franziska Krüger, under the name of Blumenschmidt, originated in the nursery of Kiese in Vieselbach-Erfurt and was also found in a nursery in Baden-Baden.—*J. C. Th. Uphof.*

5619. KIMBALL, SARAH L. The Mayflower pilgrims. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 329-339. Williams & Wilkins Co.: Baltimore, 1923.—A list of the Mayflower Pilgrims and a partial list of Americans eminent in government, law and literature who are descended from the Pilgrims are given in support of the author's thesis that this foundation stock was of great eugenic value and that it has determined the character of national development in the United States.—*L. C. Dunn.*

5620. LA RUE, CARL D. Notes on bud sport of *Hibiscus mutabilis* L. *Papers Michigan Acad. Sci. Arts and Letters* 1: 151-154. 1923.—Cuttings from the double-flowered variety *alba* were grown under the author's supervision. One of these plants produced 1 branch with flowers pink, like those of the double-flowered variety *rosea*. Two plants from cuttings from the "sporting" branch had flowers all pink; these plants and the parent branch grew more slowly than *alba*. Among 161 plants from cuttings from the normal (*alba*) part of the original bush, 1 had pink flowers on 1 branch; another had pink flowers on a sector including about $\frac{1}{3}$ of 1 branch; and a 3rd plant had green leaves on 1 portion, yellow leaves on another portion, and leaves with irregular mottled variegation (green, yellow and yellow-green) on the rest. No crosses were made, because of lack of viable pollen.—*Howard B. Frost.*

5621. LEMBKE, H. Ergebnisse neunjähriger Futterpflanzenzüchtung. [Results of 9 years of forage plant breeding.] *Beitr. Pflanzenzucht* 6: 45-56. 1922.—The author reports on selection work with English, French and Italian rye grass and presents graphs showing the variations in yield for 18 selections over a period of 5 years, 1912-16. Selected plants were first increased vegetatively by dividing each plant into 25 units and setting these out in beds 4 sq. m. in area. Notes were taken on permanence, yield, leaf number, spike form, resistance to rust, and growth progress and the seed harvested from each plot were seeded in beds 20 sq. m. in area for further increase. No crossing was done. Red clover was selected for hardiness, the original selections being a few plants that survived the severe winters of 1911-12. The remarks on red clover selection are of a general nature.—*A. J. Pieters.*

5622. LENZ, FRITZ. Erfahrungen über Erbllichkeit und Entartung an Schmetterlingen. [Experiments upon inheritance and degeneration in butterflies.] Arch. Rass.- u. Ges.-Biol. 15: 249-301. 1 pl. 1922.—Degeneration is defined as due solely to changes in hereditary constitution (idiokinesis) and to selection. Kaup's statement that the hunger blockade and subsequent scarcity of food in Germany have had an extraordinary degenerative effect upon human stock is questioned. Past experience contradicts it. Dwarf races were formerly attributed to defective feeding, but now to the selection of small biotypes better capable of withstanding famine. Pictet's numerous experiments upon caterpillars fed upon different kinds of leaves are criticised. The alleged changes due to food are merely hereditary differences brought to light by inbreeding or by natural selection under crowded conditions of breeding. The author fed the 2 parts of a wild brood of *Lymantria dispar* with willow and with oak (normal food); the former first gave more moths with pure white ground color and prominent black stripes, the latter a larger proportion with yellowish ground color and faint stripes. Progeny of a pair from each lot were fed in 2 groups, 1 on oak, 1 on willow. In neither brood were willow-fed sibs distinguishable from oak-fed, but each strain showed the hereditary peculiarities of its parent strongly emphasized. Numerical averages obtained by classifying the specimens into 3 groups as regards ground color and cross bands support the conclusion that differences in nourishment with oak or willow produce no essential change in coloration. The differences observed at first were due to chance "selection" of biotypes from a heterozygous wild brood.—A numerical study of average wing-length of the oak- and willow-fed broods shows that the German variety thrives better on oak than on willow, var. *japonica* better on willow (foods naturally preferred), but lends no support to Pictet's statements that willow-feeding modifies *L. dispar* toward *japonica* and that each after 1 generation becomes adapted to its new food. Variation depends little on food but much on sorting out of biotypes. The male is not more variable than the female as Pictet claimed; index of variability of the male is 4.0, of female, 4.8.—Feeding caterpillars on Norway spruce (*Picea excelsa*) contrary to Pictet, produced no definite changes in coloration, though it was not eaten readily and growth was checked by it. The 2nd generation fed on spruce did not differ from the 1st, except that the individuals were slightly smaller, due possibly to inbreeding but probably to the cooler summer (1921), which affected likewise oak-fed caterpillars. Spruce-feeding reduced the number of eggs laid from 800-1,000 to a few dozen, due to under nourishment. Death rate was high and breeding difficult, but this is not genuine degeneration. Pictet's claim that the offspring of parents raised on spruce adapted themselves more readily than their parents to the abnormal food (inheritance of an acquired character) is not supported by Lenz' observations; the difficulty in adaptation and mortality was about the same. Hybrid caterpillars of *Smerinthus ocellatus* ♀ (food-plant willow or poplar) × *S. tiliae* ♂ (food-plant linden) were fed in 2 lots, 1 on willow, 1 on linden; more survived on willow than on linden. Two broods studied differed widely in caterpillar color, but the 2 lots of each fed respectively on willow and on linden did not differ from each other. Nor were differences observed in hybrids of *Drepanula curvatula* ♂ and *D. falcatoria* ♀ when the larvae were fed on alder and on birch, the former species normally feeding exclusively on alder.—Lenz confirms Goldschmidt's observations that a German *dispar* ♂ × *japonica* ♀ gives normal ♀♀ and all ♂♂ of a uniform grade of intersexuality. F₂ gave likewise normal females (112) and 99 males, 19 of which were normal, the rest intersexual in various degrees as shown by their checked appearance, 56 slightly, 24 strongly checked (with white) or mainly white, the last being degenerate with crumpled wings, due to the inequality in development of the white female and brownish-gray male areas, and incapable of reproduction. He adopts Goldschmidt's view that these signs of femaleness in the intersexual male are plasmatic effects due to the action of the female-determining (Y) chromosome of the *japonica* mother. But, possibly, sex-determination in the gypsy moth depends upon several (polymeric) sex-linked factors, which in the male may be interchanged between the 2 X chromosomes.—Back-crossing of females from broods in which intersexes occur with males of the "weak" race (*dispar*) increases the proportion of intersexes among the male offspring and also the grade of intersexuality toward femaleness. A large majority of broods that descended in an unbroken female line (and no others) from the original pair produced intersexes, though several gave only normal males

and females. German *dispar* females by intersexual males gave only normal offspring.—The genetic analysis of this case is not perfectly satisfactory to the author, but he does not accept Goldschmidt's hypothesis that genes fluctuate quantitatively. The process of Mendelian segregation would be likely to equalize supposed initial quantitative differences. Polymeric sex-determining genes and their exchange between the 2 X-chromosomes seems more reasonable than "fluctuation." Objections are raised to Goldschmidt's hypothesis that an intersex develops 1 sex until it reaches a "turning-point," when sex-reversal occurs. Mosaic contiguity of parts of unlike sex is due to simultaneous spacial development, not to a temporal succession of 2 antagonistic processes. Analogy, at least, suggests that the crossing of widely different races of men is a contributing cause of those phenomena of degeneration that appears so extensively in our very much mixed population.—*J. H. Gerould.*

5623. LOEB, LEO. **Disease and heredity.** *Sci. Monthly* 16: 574-587. 1923.—From the hereditary standpoint there are 3 classes of diseases: those due to environmental factors, those due to altered constitution of the germ plasm, and those due to cooperation of altered germ plasm and environmental conditions. Several diseases are discussed as to their relation to these classes. The author is not in favor of beginning the weeding out process now; with the present imperfect knowledge it might lead to the destruction of some of the finer qualities and thus emphasize undesirable characteristics.—*L. Pace.*

5624. LOTSY, J. P. **A peculiar eye-color among Malamute-dogs.** *Genetica* 5: 77-78. 1923.—The writer discusses briefly the variation which he observed among some 30 Malamute dogs at a "Polar Animal Show" at a seaside resort near San Francisco. These dogs are said to be the result of interbreeding dog-wolf hybrids. The writer was especially struck by the frequent occurrence of asymmetry in the eyes. In 87 of the dogs, one of the eyes was wholly gray or gray in a sector, the other brown. One dog had both eyes gray. He believes that dog-wolf hybrids would repay careful study.—*Sewall Wright.*

5625. LUNDBORG, H. **Racial structure of the Finns of the northernmost part of Sweden.** *Hereditas* 4: 125-132. 4 fig. 1923.—A study is reported of the racial constitution of Norrbotten, inhabited by 3 stocks,—Nordic, Finnic, and Lappic. Eye color, cephalic index, and facial index are considered. In the case of eye color typical Nordic and Finnic subjects have light eyes while Lappic subjects are dark. By counting the number of brown eyed individuals and adding to this a number equal to 50 per cent of those with mixed eyes (heterozygotes) the proportion of eye color determiners of Lappic origin may be estimated. Treating each of the 3 traits in this way, fairly consistent results are obtained. These investigations, which are still in progress, indicate that the Nordic race is about as strongly represented among the Finnish-speaking inhabitants of Norrbotten as is the Lappic, the 2 together equaling about 60 per cent. This may explain differences which have been noticed between "Finns" of Sweden and those of Finland. Philology would have been of little assistance in such a study.—*C. H. Danforth.*

5626. MANN, MARGARET C. **The occurrence and hereditary behavior of two new dominant mutations in an inbred strain of *Drosophila melanogaster*.** *Jour. Genetics* 8: 27-36. 1923.—In a stock of *Drosophila melanogaster* maintained by a single pair, brother-sister matings, two dominant second chromosome mutants appeared. This could not have occurred if all hereditary variation were the result of recombination or segregation of unchanged genes. Notched wings (N_2) is variable in expression and only appears during the first two days of hatching. The gene for multiplied lateral bristles (*Br*) is at locus 19. Both N_2 and *Br* are compulsory heterozygotes.—*Margaret C. Mann.*

5627. McCORMICK, A. C. **Blight resistance in pear stocks.** *Nation. Nurseryman* 31: 112-114. 1923.—The history is recounted of the introduction of resistant *Pyrus ussuriensis* and *P. calleryana* from China to be used as stocks for grafting native pears. *P. betulaeifolia* is likely to be confused with *P. Calleryana* by seed collectors in China. The former is extremely

susceptible to pear blight. Using these resistant stocks and developing the resistant varieties of *P. communis*, it is estimated trees will be developed which will be 75-90 per cent proof against the disease.—*J. A. Faris*.

5628. OORTWIJN, BOTJES J. *Het verouderen van aardappelsoorten in verband met de vegetatieve voortplanting.* [Age of potato varieties in relation to vegetative reproduction.] *Cultura* 35: 65-66. 1923.—The writer does not agree with Paravicini's statements that the relation of potato diseases to higher susceptibility in old age cannot be demonstrated. A crop of an old variety may possibly give rise to a large percentage of bud variations, which externally can not be easily differentiated from the original mother type. Potato varieties are generally very heterozygous, which may be an advantage as regards formation of bud variations.—*J. C. Th. Uphof*.

5629. RAU, A. S., and J. B. GATENBY. *Notes on the distribution, morphology and cytology of the organ of Bidder.* *Jour. Roy. Microsc. Soc. London* 1923: 19-36. 2 pl. 1923.—Bidder's organ, a structure closely attached to the anterior end of the testes in some toads, is shown by cytological study to be a group of abnormal oocytes. This is interpreted as evidence for a primitive hermaphroditism among the amphibia.—*R. E. Cleland*.

5630. SIEMENS. [German rev. of: MEULENGRACHT. *Über die Erbliehkeitsverhältnisse beim chronischen hereditären hämolytischen Ikterus.* (On the hereditary relation of chronic, hereditary, hemolytic ikterus.) *Deutsch. Arch. Klin. Med.* 136: 33.] *Arch. Rass.- u. Ges.-Biol.* 14: 445. 1923.

5631. SIRKS, M. J. *Die Farbenfaktoren der Samenschale von Phaseolus vulgaris L. und P. multiflorus Willd.* [The color factors in the seedcoat of *Phaseolus vulgaris* and *P. multiflorus*.] *Mededeel. Landouwhoogeschool Wageningen* 23⁴: 1-40. 3 col. pl. 1922.—The following varieties of *P. vulgaris* were used: (1) Witte boonen—white beans without colored navel ring; (2) Citroenboonen—lemon beans, lemon colored without colored navel rings; (3) Wagenaar—directly after harvest lemon colored, with brown ring around the navel, soon becoming gray and finally light yellow-brown; (4) brown beans; (5) Rotjes boonen—rat beans with gray-brown seed color, of which 2 types were distinguished,—a light and a dark colored one; (6) black beans; and (7) Kievitsboonen—plover beans, being constantly red-violet mottled on a yellowish-white background. In a cross of lemon bean \times Wagenaar, the F_1 generation showed entire dominance of the Wagenaar and the F_2 gave a monohybrid ratio. With Wagenaar \times brown bean the F_1 produced the seed color of the brown bean and behaved as monohybrid. Lemon bean \times brown bean in F_2 gave a monohybrid ratio, 3 brown : 1 lemon. In other cases it behaved as a dihybrid and produced brown, Wagenaar, and lemon, but in a ratio other than the expected one, namely, 12:3:1. In lemon bean \times rat bean, the F_1 individuals were red-brown. The F_2 was composed of 8 distinct phenotypical groups: (1a) dark red-brown, (1b) red-brown (resembling F_1); (2a) dark gray-brown, (2b) gray-brown (these 4 groups having brown colored navel ring); (3) gray-brown, uncolored navel ring; (4) yellow bean; (5) Wagenaar type; (6) lemon type. The frequency of above types in artificial and spontaneous crosses was 17:29:4:10:23:12:5:12, a total of 112. By combining groups (1a) with (1b) and (2a) with (2b) it suggests a trihybrid ratio. Brown bean \times rat bean also appeared to be a trihybrid. With lemon bean \times plover bean, the F_1 seeds were red-violet mottled on yellow-brown background. The F_2 gave 8 distinct groups: red-violet on yellow-brown background resembling the F_1 plants; yellow-brown; Wagenaar type; plover type; lemon type; yellow-white mottled; pure white; pure white with brown navel ring. As to subtypes, some distinctions were made as to color shades. They occurred in the above order with the following ratio: 106:39:15:37:17:35:18:2, a total of 269. Brown bean \times plover bean and rat bean \times plover bean behaved as trihybrids. Brown bean \times black bean in F_1 is black and produces in the F_2 black, red-brown, and yellow-brown in the ratio 39:6:3. Plover bean \times black bean was a spontaneous hybrid, with black mottled seed on grayish background. The F_2 produced 53 plants having no white seed. Therefore, it was suggested that the pollen plant was probably

a black-seeded plant. There were 11 phenotypes: black mottled on gray background; bluish mottled on gray background; dark blue-violet mottled with white-yellow background; light blue-violet mottled on light yellow background; gray-brown mottled, here and there violet; red mottled, here and there violet; yellow-brown mottled, here and there violet; black; red-brown; Wagenaar type. On account of the few seed obtained no definite ratio could be determined. With regard to the cross, brown bean \times white bean, the F_1 was black mottled with yellow background. The F_2 gave 9 color types: F_1 type; red-brown mottled on yellow-brown; gray-brown on gray-white; yellow-brown mottled on light yellow background; black; red-brown; gray-brown; yellow-brown; entirely white. The ratio was 97:24:10:17:55:18:33:87, a total of 366. The writer presents in detail the various factors and various possibilities as to formation of various colors. *P. multiflorus* is not as easy to work with as the other species, as it is more easily cross pollinated. Concerning the different color factors of the seedcoat, (1) white is recessive; (2) light mottled is recessive to black mottled; (3) spotted predominates over mottled; (4) black predominates over light mottled, also over white.—*J. C. Th. Uphof.*

5632 SPRENGER, A. M. **Verbetering der vruchtencultuur door middel van selectie.** [Improvement of fruit growing through selection.] *Natuurwetenschapp. Tijdschr.* 4: 223-233. 1922.—A general review is presented of stock selection for various fruit trees. Bud mutations are mentioned of a peach tree forming a nectarine. A bunch of white grapes was formed by a vine which ordinarily bore blue berries. An apple tree, Pomme de Coeur, produced a branch with entirely different fruits. Bud mutations were further observed 3 times on Gold Reinette and once on Landsberger Reinette.—*J. C. Th. Uphof.*

5633. STOUT, A. B. **Alternation of sexes and intermittent production of fruit in the spider flower (*Cleome spinosa*).** *Amer. Jour. Bot.* 10: 57-66. 1 pl., 1 fig. 1923.—One hundred and twenty-eight plants of this species were studied. Development of the sex organs is very various in different flowers on the same plant. Some flowers function only as males, some only as females, and some are completely bisexual. Various intergrades occur between these types, 1 or the other of the sexual organs being partially aborted, but 1 type is never transformed into the other, as so often happens among animals. The variations from one extreme to the other are alternative and cyclic, all the flowers produced at 1 period being male and this period being followed by 1 in which female or bisexual flowers are developed. This results in intermittent production of fruit. The plants studied were all similar, none being exclusively staminate or pistillate. The flowering period is coincident with the period of greatest vegetative activity. The recurring periodic changes in the sex of the flowers are regarded as phenomena of internal regulation closely related to the influences which determine the development of the plant as a whole. Stamens and pistils only are affected, the other floral organs being similar in all the flowers. Conditions in this species favor the view that there is a tendency among higher plants away from hermaphroditism toward dioecism. The author regards the morphological differentiation of sex to be fundamentally an extension of somatic differentiation, and believes that the theory of sex chromosomes fails in its application to plants.—*E. W. Sinnott.*

5634. SUMNER, F. B. **Studies of subspecific hybrids in *Peromyscus*.** *Proc. Nation. Acad. Sci. [U. S. A.]* 9: 47-52. 1923.—Three crosses were made between geographic races yielding 347 F_1 and 296 F_2 individuals; also a study of 17 quantitative characters,—lengths of body, tail, foot, ear, pelvis, femur, skull, indices of asymmetry (sinistro-dextral ratios) in respect to pelvis length, femur length, femur weight, jaw weight; width of tail stripe, depth of pigmentation of foot, percentage of "black," white," and "color" in pelage, ratio of red to green in color readings. Mean values obtained for any character in the hybrids usually lie between the parental values, not usually equidistant, but may agree closely with or lie beyond the parental values. Means of F_1 and F_2 frequently agree, although there is a preponderant tendency for the former to exceed the latter. No evidence was secured for mendelian dominance for any single character. Tendency for increased variability from F_1 to F_2 is no greater for characters in which parent races differ than for characters in which

parent races agree; this appears especially in sinistro-dextral ratios, although these ratios are not hereditary, and it is not due to environmental factors. Coefficients of parent-offspring correlation for all crosses and characters average less than + 0.3. Mean fraternal correlation is fairly large in F_1 and F_2 , slightly greater in the former. Intra-individual correlation coefficients show that most characters associated geographically are not correlated in individuals of 1 subspecies, nor do they show any tendency to be linked in inheritance unless they are correlated in parental stocks. Doubt is expressed as to adequacy of the multiple factor hypothesis. Blending or cytoplasmic inheritance may be considered. No explanation is offered of segregation of non-hereditary characters. Heribert-Nilsson, from work on willows, questions that specific characters blend while varietal ones mendelize. In *Peromyscus* no racial characters obviously mendelize. Comparison is made with Phillips' results from bird crosses. Harrison, from work on moths, has come to postulate more gametic blending in specific than in varietal crossings. Detlefsen's results with *Cavia* may be explained by blending inheritance. It is regarded as dogmatic and premature to universalize principles of mendelian segregation.—*P. W. Whiting.*

5635. THAPAR, G. S. The occurrence and significance of a third contractile vacuole in *Paramecium caudatum* (Ehr.). Jour. Roy. Microsc. Soc. London 1923: 64-68. 1923.—The individuals with 3 vacuoles do not represent a distinct genetic strain. The appearance of a 3rd contractile vacuole is probably due to increasing amounts of soluble crystalloids which must be eliminated. Favorable environmental conditions, making for a high rate of metabolism, coupled with a slowing down in the division rate, due to the old age of the culture, account for this accumulation. The new vacuole is formed at the point where the crystalloids accumulate.—*R. E. Cleland.*

5636. WALKER, E. W. A. Studies in bacterial variability.—On the occurrence and development of dys-agglutinable, eu-agglutinable and hyper-agglutinable forms of certain bacteria. Proc. Roy. Soc. London B 93: 54-68. 1922.—In enteric and dysenteric groups of bacteria dys-agglutinable and hyper-agglutinable forms or phases occur and can be produced experimentally. Both may be obtained from the same eu-agglutinable strain of a bacillus and both may revert or be mutually converted.—*P. B. Sears.*

5637. ZADE. Die Sortenunterscheidung mit Hilfe des biologischen Eiweisddifferenzierungsverfahrens. [Variety separation with the help of biological protein differentiation processes.] Beitr. Pflanzenzucht 5: 170-181. Discussion p. 181-188. 1922.—A physiological test for identifying varieties is described. About 10 gm. of fine meal, made from seeds of wheat, peas, oats, barley, etc., singly or combined, of known varietal purity, are shaken up with a quantity of physiological common salt solution (0.95 per cent) in distilled water. After settling and filtering, the sterilized solution is injected into rabbits, subcutaneously, intravenously, or intraperitoneally, weekly for 8 or 9 weeks. Blood is then taken from ear vein, allowed to settle, and serum tested against original seed solution by "layer," "mixing," or other method. Proper condition is evidenced by a precipitate and animal is bled, and the blood serum tested against seed extracts. By proper thinning, strong precipitate follows only on the use of the homologous solution. By using several varieties in making up this solution used for injection and then omitting the components successively in testing against the blood serum and substituting an unknown variety, its identity is finally established if corresponding to one of the sorts used in the original solution. Blood sera from animals treated singly with solutions made up from a series of varieties can be used in the same way, the unknown variety being identified by the appropriate reaction. Sorts genetically identical or strains of the same variety can not be separated. The reactions are relationship reactions. The method is difficult and expensive on account of the large number of animals required. It is sufficient for purely botanical purposes for distinguishing sorts or species, but is not recommended further. The method needs simplification and refinement.—*C. E. Leighty.*

HORTICULTURE

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(See also in this issue Entries 5290, 5304, 5320, 5341, 5342, 5346, 5395, 5452, 5464, 5521, 5618, 5632, 5780, 5883, 5897, 5933, 5948, 5993, 5995, 6016, 6035, 6067, 6124)

FRUITS AND GENERAL HORTICULTURE

5638. ANONYMOUS. *Agricultura practica del café*. [Practical coffee culture.] Rev. Agric. Puerto Rico 9³: 29-34. 1922.—The coffee plantations of Porto Rico are in very poor condition due to improper care. The author outlines proper cultural methods including preparation of seed beds, transplanting, and regulation of the shading.—*John A. Stevenson*.

5639. ANONYMOUS. *Commercial English walnut orchard in the East*. Amer. Nut Jour. 17: 61. 1922.

5640. ANONYMOUS. *Testing alfalfa in the [fig] orchard*. Associated Grower 3⁷: 22. 1922.

5641. ALLEN, WILLIAM S. *Desarrollo de las regiones plataneras Tabasco y Chiapas*. [Development of the banana regions in Tabasco and Chiapas. Rev. Agric. [Mexico] 7: 320-325. 4 fig. 1922.—The Gros Michiel variety of banana does well in the southern provinces of Mexico where it is grown for export to the U. S. A. Considerable additional land is available for development. Costs of production are outlined. Yields average 700 bunches per hectare the 1st year and 1,000 thereafter.—*John A. Stevenson*.

5642. BATCHELOR, L. D. *Winter injury to young walnut trees*. 1921-22. Monthly Bull. California Dept. Agric. 11: 445-449. Fig. 163-165. 1922.—Winter injury is said to result from unfavorable soil or climatic conditions, chiefly early fall frosts before the trees are dormant. The author discusses the effect of frost on young and old trees and gives the critical temperatures and the symptoms of injury.—*E. L. Overholser*.

5643. BECKWITH, CHARLES S. *The effect of fertilizer treatments on Savannah cranberry land*. Soil Sci. 12: 183-196. 1921.—The most profitable sources of nitrogen appear to be sodium nitrate and dried blood, 20 pounds of nitrogen from the former source producing as large a crop as 30 from the latter. Ammonium sulphate and calcium cyanamide are unsatisfactory and of doubtful value as nitrogen sources. Cranberry bogs seem very deficient in phosphoric acid and applications of as high as 80 pounds of phosphoric acid per acre produced large crop increases. Acid phosphate and rock phosphate were efficient sources of phosphoric acid, and potassium sulphate and potassium chloride were good sources of potash; 500-800 pounds per acre of a complete fertilizer mixture gives best results on cranberry bogs. Overfertilization causes excessive vine growth and soft berries, and renders vines more susceptible to insect attack.—*Irl T. Scott*.

5644. BEEKHUIS, WILLIAM. *The raisin industry of California*. Associated Grower 3⁷: 20. 1922.—The author gives the history of this industry in California and briefly describes the planting and care of vineyards and the picking and curing of grapes for raisins.—*E. L. Overholser*.

5645. BETZ, C. *Birnen auf Sorbus veredeln nicht empfehlenswert*. [Pear grafting on Sorbus is not to be recommended.] Möllers Deutsch. Gärt. Zeitg. 38: 50-51. 1923.—When pear is grafted on seedlings of *Sorbus aucuparia* the fruits have a flavor of tannic acid and are therefore valueless as table fruit. Fruits of *Sorbus* are used in some parts of Germany in the manufacture of apple cider on account of the tannic acid content.—*J. C. Th. Uphof*.

5646. BIOLETTI, FREDERIC T. **Grafted vines.** Associated Grower 5⁴: 24. 1923.—On grafted vines all shoots but 1 are removed, which is tied to a stake. Suckers and roots from the scion should be removed 2 or 3 times during the summer.—*E. L. Overholser.*

5647. BIOLETTI, FREDERIC T. **Notes on double planting and cordon pruning for muscat vines.** Associated Grower 3⁷: 9. 1922.—Cordon pruning of muscat grapes as opposed to head pruning did not increase the crop of vigorous vines, and decreased the crop of weak vines 27.8 per cent. Changing the planting distance of muscat vines from 6 × 12 to 3 × 12 feet increased the crop 94 per cent at 5 years of age. This increase would probably disappear as the vines became older.—*E. L. Overholser.*

5648. BIOLETTI, FREDERIC T. **Some defects of the Black Monukka grape.** Associated Grower 5¹: 24. 1923.—While useful as a raisin, shipping, or juice grape, it is subject to spring frost injury. When allowed to overbear is poor in quality and does not ship well. Cordon pruning with short spurs remedies this difficulty.—*E. L. Overholser.*

5649. BLOKZEIJL, K. R. F. **Spice trade of Dutch East Indies.** Pharm. Era 55: 243-245. 4 fig. 1922.—The author briefly describes the cultivation and harvesting of *Myristica*, *Macis*, *Caryophyllus*, *Cinnamomum*, and *Capsicum* in the Dutch East Indies.—*C. M. Sterling.*

5650. BLOKZEIJL, K. R. F. **The quinine situation in Java.** Pharm. Era 55: 348. 1922.

5651. BRITTON, J. C. **The pruning of pecan trees.** Amer. Nut Jour. 18: 20. 1923.—No pruning is recommended for 2 or 3 years after planting. Young vigorous trees should be pruned 50 per cent, chiefly by coarse thinning, followed by summer pruning of water sprouts. Trees severely cut back are easier to spray.—*E. L. Overholser.*

5652. CLARK, KARL B. **Weighing bunches of grapes on the vines.** Associated Grower 4²: 8, 23. 1922.—Bunches were weighed by the displacement method and the determination of the specific gravity when the sugar content was 18 per cent and later when it was 23 per cent. The grapes increased 15 per cent in weight between the times of picking for fresh shipment and for raisins.—*E. L. Overholser.*

5653. CONDIT, I. J. **Colonizing caprifig trees.** Associated Grower 4³: 24. 1922.—Caprifig trees may be colonized by hanging baskets containing fertile mammoni figs in the caprifig trees during summer and fall rather than in April.—*E. L. Overholser.*

5654. CONDIT, I. J. **More fig facts and figures.** Associated Grower 4¹: 13, 22-23. 1922.—Kadota figs are being more extensively planted in California at present than any other variety, but are susceptible to red spider. The Cordelia fig, used for caprification in some districts, is worthless for that purpose. The Black San Pedro variety is of no value in the interior valleys. The best caprifig variety is the Stanford; Roeding No. 3 is good, but the Markarian No. 2 is not satisfactory. The author briefly describes the fig smut investigation and fertilizer trials being carried on by the California Experiment Station.—*E. L. Overholser.*

5655. CONDIT, I. J. **The Stanford Smyrna fig.** Associated Grower 4³: 6. 1922.

5656. CONDIT, I. J. **Topworking fig trees.** Associated Grower 5³: 14-15, 23. 1923.—Young fig trees of undesirable varieties may be topworked between April and October by shield budding on 1-3-year-old branches. Older trees may be topworked by cleft grafts early in the season or by bark grafts in April or May. Two-year-old scions are used.—*E. L. Overholser.*

5657. DANIEL, LUCIEN. **Variations des parfums sous l'influence du greffage.** [Variations in perfumes under the influence of grafting.] Compt. Rend. Acad. Sci. Paris 176: 999-1001. 1923.—It is found that volatile products of the epibiot are in certain instances modified

in quantity and quality by the hypobiot used. In *Artemisia absinthium* the taste and odor as well as certain structural characters are different if grafted on other hypobiotics. This difference increases with age, and there is some evidence that it may be transmitted in the seed.—C. H. Farr.

5658. DELAIRE, EUGENE. *Savez-vous comment les Chinois obtiennent des arbres nains?* [How do the Chinese produce dwarf trees?] *Nat. Canadien* 49: 63-64. 1922.—The tree seed is planted in soil in an orange skin, the rootlets coming through the orange rind being clipped off for 2 or 3 years. The mature tree may thus not much exceed a handbreadth.—A. H. MacKay.

5659. DEMAREE, J. B. *Pecan kernel-spot and its relation to insect punctures.* *Amer. Nut Jour.* 17: 66. 1922.—Pecan kernel-spot is caused directly by punctures of a sucking insect, particularly the Southern stink bug, *Nezara viridula*. Substituting velvet beans for cowpeas as a cover crop aids in controlling the pest.—E. L. Overholser.

5660. EARLE, F. S. *La industria del café en Puerto Rico.* [The coffee industry in Porto Rico.] *Rev. Agric. Puerto Rico* 9⁵: 5-6. 1922.—The present ruinous condition of the coffee industry in Porto Rico is due not to economic conditions but to faulty cultural practices, which include too close planting, excessive shading (which favors development of fungous diseases), using shade trees that harbor injurious coffee insects, and careless pruning.—John A. Stevenson.

5661. GIROLA, CARLOS D. *Cultivo de la yerba mate. Torrefaccion y preparacion del producto.* [Cultivation of yerba mate. Curing and preparation of the product.] *Bol. Ministerio Agric. Nacion [Argentina]* 26: 447-488. 26 fig. 1921.—The author discusses at length the picking, curing, and commercial handling of yerba mate (*Ilex paraguariensis* St. Hil.). [See also *Bot. Absts.* 12, Entry 5911.]—John A. Stevenson.

5662. GIROLA, CARLOS D. *Cultivo de la yerba mate. Vegetación, morfología e histología de las hojas.* [Cultivation of yerba mate. Development, morphology, and histology of the leaves.] *Bol. Ministerio Agric. Nacion [Argentina]* 27: 247-261. 7 fig. 1922.—The author describes leaves and flowers of yerba mate (*Ilex paraguariensis*), a plant which may develop into a tree but on plantations is kept down to bush form by pruning. The structure of the various leaf tissues is given in detail, based on the work of Lendner. [See also *Bot. Absts.* 12, Entry 5911.]—John A. Stevenson.

5663. GRAM, H. *Ompodning af Frugttraeer.* [Grafting of old fruit trees.] *Haven* 23: 17-24. Fig. 1-12. 1923.—Directions are given for the different methods of rejuvenating orchards.—Ernst Gram.

5664. GRIST, D. H. *Kapok.* *Malayan Agric. Jour.* 11: 3-27. 1923.—The author reviews the present status of Kapok (*Eriodendron anfractuosum*) and its products. Sections are devoted to its botanical features, uses, buoyancy value in life-jackets, by-products (the seed yields oil and feeding-cake), oil, climate suitable for cultivation, soil, propagation, age of bearing, pests and diseases, harvesting, ginning, pressing and baling, markets and yield. Appendices deal with the organization of the kapok industry, lists of importers of kapok in England, America, and Australia, and a statement of costs and income of 500 acres in 1911.—R. E. Holttum.

5665. HALBERT, H. A. *Will pecans come true to variety when nuts are planted?* *Amer. Nut Jour.* 17: 7, 11. 1922.—Pecan seed reproduce the variety provided pollination has been by the same variety.—E. L. Overholser.

5666. HELGASON, E. *Korte Traek fra Islands Havebrug.* [Short remarks on horticulture in Iceland.] *Haven* 23: 33-36. 1923.

5667. HENRIQUEZ, J. ACOSTA. **Sombra para cafetales.** [Shade for coffee plantations.] *Rev. Agric. Puerto Rico* 8⁵: 19-26. 1922.—Shade for coffee plantations is considered of very great importance in Porto Rico. Bananas are planted for temporary shading until the permanent growth of leguminous trees is ready. The trees most commonly used are Guava and Guama (*Inga* spp.), Moca (*Andira inermis*), and Bucare (*Erythrina* spp.). These trees and the character of the shade given are described. Growing seedlings in nursery beds is recommended instead of the present method of using chance seedlings. Preparation of seed beds is described. Certain shade trees which harbor insect pests and fungous diseases of coffee plants should be eliminated. Pruning and a definite system of renewal, to which no attention is paid at present, must be practised for successful coffee cultivation.—*John A. Stevenson.*

5668. HODGSON, ROBERT W. **Cover crop pointers.** *Monthly Bull. California Dept. Agric.* 12: 48-51. 1923.—Purple vetch, *Vicia atropurpurea* Desf., is promising and will be widely planted in citrus orchards, partially replacing *Melilotus indica* [(L.) All.], due to its more rapid growth.—*E. L. Overholser.*

5669. HOYT, W. B. **Blackberries in south Florida.** *Florida Grower* 27¹³: 4. 1923.—A variety called Australian is described as being suitable for southern Florida. The fruit ripens from May to June, and directly afterward the old twigs are cut and the new growth trained to the wires. Plants may be set at any time of the year if given plenty of moisture, but during dry weather they should be well shaded until thoroughly rooted.—*J. C. Th. Uphof.*

5670. KELLER, H. R. **Results with cover crops.** *Associated Grower* 3⁶: 16. *Fig. 1.* 1922.

5671. LANGE, A. **Vinteren 1921-22 Virkning paa Havplanterne.** [The effect of the winter 1921-22 on garden plants.] *Nat. Verden* 6: 277-280. 1922.

5672. LEGRAND, J. FEDERICO. **Cultivo del alcanfor en Puerto Rico.** [Cultivation of camphor in Porto Rico.] *Rev. Agric. Puerto Rico* 6⁵: 7-10. *1 fig.* 1921.

5673. LEGRAND, J. FEDERICO. **Plantas útiles de Puerto Rico.** [Useful plants of Porto Rico.] *Rev. Agric. Puerto Rico* 6¹: 21-25. 1921.—The author gives the botanical classification, physical and chemical properties, and uses of *Peperomia rotundifolia*, *Amarantus viridis*, *Heliotropium indicum*, and *Heliconia caribea*.—*John A. Stevenson.*

5674. LEGRAND, J. FEDERICO. **Plantas útiles de Puerto Rico. El cacao.** [Useful plants of Porto Rico. Cacao.] *Rev. Agric. Puerto Rico* 6⁷: 7-16. 1921.—The author discusses the botanical characteristics, structure and composition of the seed, cultivation, and uses of cacao.—*John A. Stevenson.*

5675. LEGRAND, J. FEDERICO. **Plantas útiles de Puerto Rico. El café.** [Useful plants of Porto Rico. Coffee.] *Rev. Agric. Puerto Rico* 6⁴: 11-20. *7 fig.* 1921.—Botanical characteristics, chemical and physical properties, culture, uses, and commercial aspects of coffee are given.—*John A. Stevenson.*

5676. LEITCH, MARIÁ, y MARGARITA W. LEITCH. **El aguacate guatemalteco.** [The Guatemalan avocado.] *Rev. Agric. Puerto Rico* 7⁴: 5-34. *18 fig.* 1922.—The author discusses the possibilities of the successful culture in Porto Rico of Guatemalan varieties of avocado, based largely on opinions of horticulturists in the Island and the continental U. S. A.—*John A. Stevenson.*

5677. MACKIE, D. B. **Vacuum fumigation of citrus nursery stock in Ventura County.** *Monthly Bull. California Dept. Agric.* 11: 726-735. *Fig. 172-176.* 1922.

5678. MARI, MATIANO. **La vainilla.** [Vanilla.] *Rev. Agric. Puerto Rico* 9⁵: 29-31. 1922.

5679. MORRIS, ROBERT T. **Paraffin in hot climates.** Amer. Nut Jour. 17: 47. 1922.—To prevent melting of the paraffin covering of grafts, stearic acid is added to the paraffin, and the grafts are whitewashed.—*E. L. Overholser.*

5680. MOSNAT, H. R. **The Lewis hardy black walnut.** Amer. Nut Jour. 18: 60. 1923.—The variety is large, smooth, soft shelled, mild in flavor, and is adapted to many waste acres in the Corn Belt. Half meats can be obtained and find a market. By-products can be made from the husk.—*E. L. Overholser.*

5681. MÜLLER, R. **Stachelbeer-Erfahrungen.** [Gooseberry experiences.] Möllers Deutsch. Gärt. Zeitg. 38: 65-66. 1923.—The largest varieties are not always of commercial advantage. Medium to large fruited varieties with somewhat hairy and thin skins are best commercially. Some markets demand red, others yellow and dark green, varieties. The red are used for marmalade, the dark green for preserving. The prolific varieties with medium sized, thin skinned fruits are most suitable for wine making. They are planted late in October or late in March or early April and the twigs pruned back to 3 buds. Strongly developed 1-year-old twigs are pruned back to 6-8 buds. Distance of planting is 1.7-1.8 m.—*J. C. Th. Uphof.*

5682. OLIVEIRA, ARTURA A. **Métodos practicas para el cultivo de la yerba mate en la territorio de Misiones.** [Practical methods for the cultivation of yerba mate in the Territory of Misiones.] Bol. Ministerio Agric. Nacion [Argentina] 26: 403-407. 1921.—Directions are given for growing *Ilex paraguariensis* St. Hil. from the preparation of the soil and planting to harvesting and curing the leaves.—*John A. Stevenson.*

5683. OVERHOLSER, E. L. **Effects of thinning peaches.** Assoc. Grower 54: 7. 1923.

5684. OVERHOLSER, E. L. **Future outlook for California's new deciduous fruit acreage.** Assoc. Grower 42: 12, 25-27. 1922.

5685. QUAIL, JOHN L. **Pruning peach trees.** Assoc. Grower 51: 40. 1923.—The author cautions against too little pruning and too little thinning of fruit under the "long pruning" system. Care should be taken in training young trees, and only 3 main limbs left.—*E. L. Overholser.*

5686. READ, F. W. **Facts and figures regarding the deciduous fruit industry.** Monthly Bull. California Dept. Agric. 12: 39-43. 1923.

5687. REINHARDT, H. **Stachelbeere Runde Weisse, ein Massenträger.** [Gooseberry Runde Weisse, a prolific producer.] Möllers Deutsch. Gärt. Zeitg. 38: 65. 1 fig. 1923.—The variety was compared with many others. It is very productive, sweet and thin skinned, and is recommended for wine-making and marmalade.—*J. C. Th. Uphof.*

5688. ROLFS, P. H. **Brazilian fruits and the Centennial.** Florida Grower 27¹⁰: 4-5. 4 fig. 1923.—The indigenous jaboticaba, a Myrtaceous fruit little known outside of Brazil, is delicious and refreshing. The dwarf mangoes are of considerable value. The variety Itamaraca weighs 4-8 ounces, is very much flattened longitudinally, and the meat resembles custard. The Carlotta and Augusta mangoes are also grown. The litchi, avocado, and jack fruit are discussed.—*J. C. Th. Uphof.*

5689. SANTA MARIA, MIGUEL. **Cultivo y producción del cocotero en Mexico.** [Culture and production of the coconut in Mexico.] Rev. Agric. [Mexico] 7: 186-188. 4 fig. 1922.—The coconut thrives in a number of the states of Mexico below the parallel of 25°. The average annual yields are 50-100 nuts per tree. Cultural directions are given.—*John A. Stevenson.*

5690. SCHINDLER. *Erdanschüttungen an Baumstämmen.* [Earthing up tree stems.] Möllers Deutsch. Gärt. Zeitg. 38: 67. 1923.—The stem of a wild, 30-year-old, sweet cherry was covered 1 m. with light soil. It produced a new root system in this soil and no damage was observed. The same was observed in a Canada Reinette and a Gravenstein apple in Westerwald.—*J. C. Th. Uphof.*

5691. SCHMIDT, RICHARD. *Budding of vines given large scale test.* Assoc. Grower 4: 11, 22. 1922.—Budding gives promise of replacing grafting as a means of propagating Vinifera grapes on resistant root stocks. The method of budding used is known as the "Yema graft."—*E. L. Overholser.*

5692. SCHMIDT, RICHARD. *New varieties of grapes.* Assoc. Grower 3: 19, 34. 4 fig. 1922.—The Black Monukka grape is early, black, bears heavily but ripens irregularly. It may be shipped or cured for raisins, and is considered promising. The Maraville de Malaga is used as a pollinizer for Ohanez. Its excellent fruit ripens with the Malaga. It does best in the cooler sections on the heavier soils. The Olivette Blanche is excellent in size, shape, and bearing qualities, but lacks flavor. Gros Guillaume is a large blue grape superior to Gros Coleman in flavor and keeping qualities. The clusters, however, fill poorly. The Hunisa bears excellent crops of red berries. The bunches fill well in the Sacramento Valley, but it has proved less satisfactory in the San Joaquin Valley.—*E. L. Overholser.*

5693. SCHMIDT, RICHARD. *Pruning new varieties of grapes.* Assoc. Grower 4: 12. 1922.—The author tentatively recommends that the Black Monukka grape be pruned like the Thompson Seedless, except that canes be cut shorter; and suggests that Maraville de Malaga, Ohanez, and Olivette Blanche be pruned similarly except that fewer canes be left.—*E. L. Overholser.*

5694. SCHULTZ, E. F. *La naranja de verano "Lue Gim Gong."* [The Lue Gim Gong orange.] Rev. Indust. y Agric. Tucuman 12: 121-124. 2 fig. 1922.—The variety, originated in Florida, has been under successful trial at the Tucuman experiment station since 1915. The crop matures late in the fall and the fruit holds its quality well. The Tucuman orange growers can not now compete with those of other sections of Argentina which have cheap water transportation; but the introduction of this late maturing variety will obviate the difficulty.—*John A. Stevenson.*

5695. SCHUSTER, C. E. *The Barcelona filbert.* Amer. Nut Jour. 17: 77. 1922.—The Barcelona filbert, propagated by layering, is the best variety tested at the Oregon Experiment Station. It is self-sterile; Du Chilly has been found the best pollinator, planted in the proportion of 1 to 8. Harvesting and drying costs for filberts are low and it is so far not necessary to spray.—*E. L. Overholser.*

5696. SCHWERIN, FRITZ VON. *Folgen von Erdanschüttungen an Baumstämmen.* [Results of earthing up tree stems.] Möllers Deutsch. Gärt. Zeitg. 38: 49-50. 2 fig. 1923.—Young trees set too deep are often injured, but old ones may be mounded up without damage. Various examples are given. Stems of *Aesculus* 80 years old were banked 2 m. without injury.—*J. C. Th. Uphof.*

5697. SPINOSA, JOSE P. *Apuntes sobre el cultivo del naranjo referidos especialmente al territorio nacional de Misiones.* [Orange culture with special reference to the Territory of Misiones.] Bol. Ministerio Agric. Nacion [Argentina] 27: 3-185. 31 fig. 1922.—The orange was very extensively cultivated by the Jesuits around their missions during the Spanish regime in Argentina but the culture has gradually dropped away. Oranges are raised extensively, however, in the Territory of Misiones and the industry there is capable of much expansion. Climatic and soil conditions are discussed. The sweet orange is the variety most commonly grown and to a lesser extent the sour orange. Other varieties thought to be adapted to grow-

ing in the territory are described. The author gives detailed methods for successful citrus culture from the preparation of the seed bed to harvesting the fruit. Gummosis is the most serious disease encountered and measures for its control are given.—*John A. Stevenson.*

5698. TELLEZ, OLIVERIO. *El nogal-su cultivo, explotacion y plagas.* [Culture, exploitation, and pests of the walnut.] *Rev. Agric. [Mexico]* 7: 181-185. 7 fig. 1922.—All of the economic species of *Juglans* grow well in Mexico and more extensive culture is recommended. Varietal descriptions and cultural directions are given.—*John A. Stevenson.*

5699. WOODFIN, J. C. *Vine culture under glass.* *New Zealand Jour. Agric.* 24: 287-293, 344-349. 1922; 25: 345-351. 1922; 26: 39-43, 172-177. 7 fig. 1923.—The problems in connection with grape growing under glass are discussed under the following headings: situation, description of vine house, size of house, the trellis, the border, planting, distance between plants, descriptive terms used, training the vines, leading vines into house, establishing strong plants, 1st year's training, manuring, ventilation, bearing laterals, routine work, sublaterals, setting and thinning of the berries, the stoning period, the 2nd swelling and coloring, the after ripening period, manuring established vines, watering, black varieties, white varieties, powdery mildew, vine Sclerotinia, grape spot, shanking, scalding, warted leaves, aerial roots, mealy bug, red spider, and thrips.—*N. J. Giddings.*

5700. WOODROOF, J. G. *Variation in seedlings—especially pecans.* *Amer. Nut Jour.* 17: 67. 1922.—At the Georgia Experiment Station the pecan varieties found to produce the best seedlings for propagation purposes were the Bradley, Lee, and Teche.—*E. L. Overholser.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

5701. BØRGENSEN, F. *Vinterens Indflydelse paa en Del stedsegrønne Buske og Traeer i en Have i Hellebaek.* [The influence of the winter on several evergreens in a Danish garden.] *Gart. Tidende* 38: 337-341. 353-356, 365-366. Fig. 1-10. 1922.—An annotated list is given of a collection of foreign trees and shrubs and their hardiness in the severe winter 1921-22.—*Ernst Gram.*

5702. GOOS UND KOENEMANN. *Die neue Edeldahlien Zukunft, Friede und Fürstin Anna von Donnersmarck.* [The new improved Dahlias Zukunft, Friede, and Fürstin Anna von Donnersmarck.] *Möllers Deutsch. Gärt. Zeitg.* 38: 73. 3 fig. 1923.—Zukunft produces high, free flowers which are red with orange, and yellowish toward the base. The flowerstalk is solid, 40 cm. long. Fürstin Anna von Donnersmarck has light carmin-red flowers, recommended for bouquets. The abundant flowers of Friede are white, with violet toward the center. The flowerstalk is long and solid.—*J. C. Th. Uphof.*

5703. MÜLLER, GUSTAV. *Neue deutsche Edelnelken.* [New German improved carnations.] *Möllers Deutsch. Gärt. Zeitg.* 38: 97. 2 fig. 1923.—Andenken an August Holz has long stems and beautiful, large salmon red flowers. Frigga has pink flowers, 10-12 cm. in diameter. The originator is August Holz.—*J. C. Th. Uphof.*

5704. MÜLLER, GUSTAV. *Riesen-Edeldahlie Goldglanz.* [Giant improved Dahlia Goldglanz.] *Möllers Deutsch. Gärt. Zeitg.* 38: 69. 1 fig. 1923.—The new variety, of the same group as Kalif, produces very large gold-yellow flowers.—*J. C. Th. Uphof.*

5705. STEFFEN, A. *Verschiedene Vergissmeinnichtsorten und ihr Wert für die Erwerbsgärtnerei.* [Several forget-me-not varieties and their value in commercial floriculture.] *Möllers Deutsch. Gärt. Zeitg.* 38: 81-82. 2 fig. 1923.—Several varieties are described, especially Perle von Ronneburg, Oblongata Perfecta, Albion, Hindenburg, Ruth Fischer, Marga Sacher, and Isolde Krotz (novelty 1922). Oblongata Perfecta is especially recommended for bouquets and Marga Sacher for pot growing.—*J. C. Th. Uphof.*

5706. ZÖRNITZ, H. *Neuere Stauden.* [New herbaceous plants.] Möllers, Deutsch. Gärt. Zeitg. 38: 83-84. 1923.—*Primula Helenae* was originated from crosses between *P. acaulis* hybrids \times *P. Juliae*. They are easily propagated by division. *Trollius* Orange König, *Leucanthemum maximum* Ophelia, and *Erica cinerea splendens* are also mentioned. They were originated by George Arends in Ronsdorf.—*J. C. Th. Uphof.*

VEGETABLE CULTURE

5707. ANONYMOUS. *La coliflor.* [Cauliflower.] Rev. Agric. [Mexico] 7: 246-248. 1922.—The culture of cauliflower under Mexican conditions is discussed.—*John A. Stevenson.*

5708. BREMER, A. H. *Om avstand for hvidkaal i forsök.* [Spacing of cabbage in experiments.] Nordisk Jordbrugsforskning 1922: 289-296. 1 *diagr.* 1922.—Cabbage varieties differ in the spread of leaves and resulting space requirements. Crowding of spreading types gives loose heads. For experimental work the space requirements of each variety are determined by a preliminary test.—*Ernst Gram.*

5709. CLAYTON, E. S. *Onion experiments at Dorrigo.* Agric. Gaz. New South Wales 34: 326. 1923.—A complete mineral fertilizer increased the yield nearly 100 per cent and produced a larger percentage of marketable onions than the untreated land.—*L. R. Waldron.*

5710. CORTES, A. SURO. *Breve estudio sobre la siembra de ajos.* [Garlic culture.] Rev. Agric. Puerto Rico 94: 27-29. 1922.—Seed selection, preparation of the soil, sowing the seed, fertilization, cultivation, and harvesting are discussed.—*John A. Stevenson.*

5711. DOMINGUEZ, IGNACIO. *La col.* [Cabbage.] Rev. Agric. [Mexico] 7: 189-192. 12 *fig.* 1922.—Descriptions of varieties recommended for growing under Mexican conditions are given; cultural directions follow.—*John A. Stevenson.*

5712. DOMINGUEZ, IGNACIO. *La pequeña huerta cultivo de las raíces comestibles.* [The cultivation of edible roots in the small garden.] Rev. Agric. [Mexico] 7: 299-302. 2 *fig.* 1922.—Popular.—*John A. Stevenson.*

5713. DOMINGUEZ, IGNACIO. *La zanahoria.* [The carrot.] Rev. Agric. [Mexico] 7: 133-135. 1 *fig.* 1922.—Carrot culture in Mexico is discussed.—*John A. Stevenson.*

5714. GRIFFITH, JEAN P. *La industria vegetal en Puerto Rico.* [The vegetable industry in Porto Rico.] Rev. Agric. Puerto Rico 86: 43-50. 1922.—Due to adverse conditions of climate and soil and presence of diseases and insects, vegetables are not produced in great quantities in Porto Rico. Statistics of production of beans, sweet potatoes, yams, yautias, and onions are given. Some vegetable crops can be grown successfully in the uplands. Onions do well in the northwest of the Island. Experimental work aimed at the production of resistant varieties of tomatoes and some other vegetables is under way.—*John A. Stevenson.*

5715. IBARRA, DAVID S. *El cultivo del melon en el Bajío* [Cultivation of the melon in Bajío.] Rev. Agric. [Mexico] 7: 192-195. 5 *fig.* 1922.—The Rocky Ford melon has been introduced and grown on a considerable scale in parts of Mexico, but has been allowed to hybridize with other types with a resulting deterioration. Melons in this region are commonly cultivated in alternating rows with corn. Recommendations for improving the crop are given.—*John A. Stevenson.*

5716. JOHNSEN, J. *Kan Haveaerter saa tidligt?* [Early sowing of garden peas.] Gart. Tidende 39: 113-114. 1922.—With 30 days difference in time of seeding peas the difference in appearance above ground was 11 days, and in flowering only 5. With one exception, the yield of green peas was higher on the late plantings.—*Ernst Gram.*

5717. LEGRAND, J. FEDERICO. *Plantas utiles de Puerto Rico*. [Useful plants of Porto Rico.] Rev. Agric. Puerto Rico 7²: 5-8. 1921.—The author gives briefly the botanical characteristics of *Chrysophyllum cainito*, *Antigonon leptopus*, and *Cucurbita pepo* with an enumeration of the uses to which they are put in Porto Rico.—*John A. Stevenson*.

5718. LOBNER, MAX. *Die wirtschaftlich wertvollsten Tomaten*. [The most valuable tomatoes economically.] Möllers Deutsch. Gärt. Zeitg. 38: 85-86, 101. 1923.—A description and comparison of the principal tomato varieties is presented. Lukullus Trieb is a resistant, prolific rather late bearer. Schöne von Lothringen is recommended as large and early. Bonner Beste may in the future be of value on account of its earliness. Preys Delicatess, a greenhouse type, is prolific, of compact growth, and has very large fruits. Tuckwood is commonly grown in the Netherlands in glasshouses.—*J. C. Th. Uphof*.

5719. PITT, J. M. *Farmers' experiment plots*. Trials with peas, onions, and other vegetable crops. 1922. Lower north coast. Agric. Gaz. New South Wales 34: 271-280. 3 fig. 1923.—The pea variety Greenfeast of the Wonder type, decidedly outyielded all other varieties, producing 514 bushels per acre. This variety is popular in the market and sells well during glut periods. Ten onion varieties were under trial. The variety Odorless yielded 10.6 tons per acre with the Early Barletta at 7.35 tons standing second. Notes are given on other garden crops.—*L. R. Waldron*.

5720. WEISHAAR, L. J., AND S. S. ROGERS. *Review of the 1922 broccoli season at Colma, California*. Monthly Bull. California Dept. Agric. 11: 442-445. 1922.—The authors discuss the importance of Colma as a broccoli-producing section and give a history of the Colma Vegetable Association.—*E. L. Overholser*.

5721. WEISHAAR, L. J., AND S. S. ROGERS. *Successful marketing of California vegetables*. Monthly Bull. California Dept. Agric. 11: 721-725. 1922.

HORTICULTURE PRODUCTS

5722. ANONYMOUS. *The grapefruit grower becomes a canner*. Florida Grower 27¹²: 3. 1923.—The possibilities of canning grapefruit are presented.—*J. C. Th. Uphof*.

5723. ALLEN, W. J. *How to dry figs*. Agric. Gaz. New South Wales 34: 376. 1923.

5724. BARNARD, L. C. *Peach drying*. Associated Grower 4²: 28-29. 1922.

5725. BERG, E. A. *Putting figs on the American table*. Associated Grower 5¹: 32. 1923.

5726. CRUESS, W. V. *Raisin by-products*. Associated Grower 5⁴: 12, 26. 1923.—A carbonated beverage called Raisinate, a raisin syrup, and several raisin candies have been perfected by the Fruit Products Division of the California Experiment Station.—*E. L. Overholser*.

5727. EATON, B. J. "Whole" rubber or desiccated latex. Malayan Agric. Jour. 10: 288-294. 1922.—Non-caoutchouc constituents of latex provide valuable vulcanization accelerators; these are lost by ordinary coagulation methods. The Hopkinson process for the preparation of "whole" rubber by desiccation of latex (in an apparatus similar to that used for milk desiccation) is described. It is claimed that this rapid process gives a vulcanized rubber of greater tensile strength and uniformity than the ordinary milled rubber. There are practical difficulties to be overcome.—*R. E. Holtum*.

5728. EATON, B. J., AND J. H. DENNETT. *Preliminary and interim report on investigations on the production of alcohol from Nipah palms*. Malayan Agric. Jour. 11: 47-63. 1923.—The actual area at present covered with *Nipa fruticans* in the Federated Malay States is estimated at about 18,000 acres. Experimental tapping was carried out in 3 areas. According to

local custom a preliminary treatment covering 3 months is necessary before tapping commences, but it is hoped this can be reduced. Yields were irregular, but it is considered that with proper treatment $\frac{1}{4}$ – $\frac{1}{2}$ gallon of juice per palm per day can be obtained. Experiments indicate that control of fermentation of the juice is easier than has been reported from the Philippines; natural fermentation is far from complete after 24 hours if glazed vessels are used. The average sugar content of the juice is about 12.5 per cent. No great difficulties are expected in the manufacture of alcohol. The production of high grade sugar is difficult because of (1) inversion of sugar during collection and (2) the presence of persistent organic nitrogenous substances. Some notes on planting methods are appended.—*R. E. Holttum.*

5729. EATON, B. J., AND J. H. DENNETT. The comparative buoyancy of Malaya and Java Kapok. *Malayan Agric. Jour.* 10: 295–300. 1922.—Experiments show that the Malaya samples are only slightly inferior to the Java samples and are well above the Board of Trade standard of buoyancy for life-jackets. More details are necessary as to the conditions under which the standard tests should be carried out.—*R. E. Holttum.*

5730. GEORGI, C. D. V. Cashew nut oil. *Malayan Agric. Jour.* 10: 301–302. 1922.—Kernels of nuts of *Anacardium occidentale* are shown to contain 40–45 per cent of oil, but a high pressure is required for complete extraction; the cake remaining after extraction contains 33.4 per cent of albuminoids.—*R. E. Holttum.*

5731. GEORGI, C. D. V. Kapok oil. *Malayan Agric. Jour.* 10: 284–286. 1922.—Seeds of Kapok (*Eriodendron anfractuosum*) contain 20 per cent of oil which is easy to extract; analyses and properties of the oil are given. It is used to a small extent for edible and soap-making purposes, and will probably be more used when larger supplies are available. After extraction of the oil the cake contains 3.98 per cent of nitrogen and is a valuable feeding stuff.—*R. E. Holttum.*

5732. OVERHOLSER, E. L. Keeping the fig in fresh condition by low temperatures. I. *Associated Grower* 3⁶: 9, 33–34; 3⁷: 13. 1922.—Fresh figs can be stored at 32°F. for short periods only. Freezing at 10 and 26°F. were tested. The methods were: (1) immersion in water or sugar solution in sealed containers and (2) glazing the fruit with ice. Fruit stored at 10°F. kept as late as April 1. Glazing with ice was unsatisfactory. Fruits soften rapidly after removal from storage and are best used for cooking. Those held in 30–50 per cent sugar at 10°F. may be eaten as fresh fruits within 8–10 hours after taken from storage.—*Mary Barrett.*

5733. WEISHAAR, L. J. Net weight or quantity marking requirements for fruit and vegetable containers. *Monthly Bull. California Dept. Agric.* 11: 450–454. 1922.

5734. WIEGAND, ERNEST H. Recirculation driers. *Oregon Agric. Exp. Sta. Circ.* 40. 11 p., 6 fig. 1923.—The main advantages of recirculating the air in prune driers are: (1) saving heat and fuel, (2) adding moisture to the air, (3) decreasing drying time, (4) lowering drying cost, and (5) increasing the quality by lowering the temperature. Detailed instructions are given for building this new type of prune drier, and for remodeling the older types.—*C. E. Owens.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 5426, 5442, 5633, 5657, 5662, 5934, 5949, 5950, 5951, 5986, 5987, 6003, 6036, 6066, 6084)

5735. ARBER, AGNES. On the leaf-tip tendrils of certain monocotyledons. *Jour. Indian Bot. Soc.* 3: 159–169. 3 pl. 1923.—The anatomy of leaf-tip tendrils is described and figured for representatives of 5 genera (*Gloriosa*, *Littonia*, *Sandersonia*, *Fritillaria*, and *Polygonatum*)

of Liliaceae, and for *Flagellaria indica* L. Leaf anatomy of all three genera (*Flagellaria*, *Susum*, and *Joinvillea*) of Flagellariaceae is also given. Tendril tips all coil downward in the Liliaceae, and upward in *Flagellaria*. In the liliaceous leaves the numerous bundles, each with its own sheath of sclerotic tissue, gradually coalesce into 3 bundles in the tendril, and finally into 1. In *Gloriosa*, *Littonia*, and *Sandersonia* the 3 bundles are embedded in a single massive sheath of sclerotic tissue. In the *Flagellaria* tendril there are several bundles in a single sheath, but most of the sclerenchyma is in the mesophyll, quite distinct from the vascular bundles. *Susum* leaves show several series of bundles in the sheath and leaf base. The smallest bundles toward the center of the upper surface of the leaf are inversely oriented. *Joinvillea* leaves are plicate, with large epidermal cells at the bases of the grooves. Sheath and leaf base also have more than 1 series of bundles.—On the phyllode theory, the leaves of *Flagellaria* may be interpreted as “consisting of a sheath succeeded by a limb which is a horizontally expanded petiole,” while the tendril represents the “apical part of this flattened petiole.” The liliaceous leaves may be similarly interpreted, or possibly “the limb in these species may be of leaf-sheath nature, in which the tendril may represent either the apex of the leaf-sheath, or the vestigial rudiment of a petiole.” The structure of leaf-tip tendrils seems to be determined “by the inherent anatomical tendencies of the species, rather than by the response to a common physiological need.”—Winfield Dudgeon.

5736. BAILEY, I. W. Notes on neotropical ant-plants. II. *Tachigalia paniculata* Aubl. Bot. Gaz. 75: 27-41. Pl. 1-2, fig. 1-3. 1923.—The leaf of this leguminous plant is characterized by a hollow fusiform petiole or rachis base. More than 30 species of insects were found inhabiting the petiole cavities. Beetles at first cut their way into the cavities and feed upon the wall of amber-colored medullary tissue. Certain coccids are also present and furnish the beetles with a sugary exudate. Ants (*Azteca* or *Pseudomyrma*) eventually drive out the beetles. The stimulation of the ants while biting out tissue to enlarge the cavity induces changes involving a widening of the primary rays and an inhibition of certain thick-walled elements. The ants, it is believed, feed vicariously through the agency of the coccids, using not only the excretions of the latter but also directly consuming the body of the insect. “There is no evidence to indicate that the structural peculiarities of *T. paniculata* are initiated by ants or by gall forming insects, or that they originated as adaptations for attracting a defending army of ants. The relations between the host plant and the beetles and the ants are not those of a mutually beneficial symbiosis but an interesting type of parasitism, in which there is a remarkable parallelism in the behavior of representatives of such widely separated groups of insects as the Hymenoptera and Coleoptera. The nesting and feeding habits of the insects, and their relations to the coccids, are very largely determined by the structure and arrangement of the vegetative tissues during different stages in the development of the petiole and rachis.”—B. W. Wells.

5737. BUGNON, P. Sur le nombre des cotylédons de la Ficaire. [The number of the cotyledons of *Ficaria*.] Compt. Rend. Acad. Sci. Paris 176: 766-769. 1923.—*Ficaria ranunculoides* has sometimes been considered as having no cotyledons; at other times, as having 1 cotyledon; and finally, as having 2 cotyledons. A careful description is here given of the embryo, and the various theories and their bases are discussed. It is concluded that there are 2 foliar organs having the same anatomic connections with the root as the 2 cotyledons of the species of the same family which are obviously dicotyledonous. The most plausible hypothesis seems to be that this species is heterocotyledonous, one cotyledon being better developed than the other.—C. H. Farr.

5738. BURKILL, I. H. Notes on Dipterocarps; No. 9. On the differences in the seedlings between *Balanocarpus maximus* King and *B. Heimii* King. Jour. Malayan Branch Roy. Asiatic Soc. 1: 218-222. Fig. 1-10. 1923.—The seeds and seedlings of *B. maximus* are here described for the 1st time; those of *B. Heimii* were described under the name *B. maximus* (see Bot. Absts. 6, Entry 1896). The cotyledons of *B. maximus* are not markedly dissimilar, as are those of *B. Heimii*; they are packed parallel in the seed, and are of about equal length. The

1st leaves of the seedling are a pair (4 or 5 together in *B. Heimii*) and the youngest plant is purplish. The fruit is not dehiscent in either species, but is ruptured irregularly.—*R. E. Holttum.*

5739. CLUTE, WILLARD N. The flowers of the magnolia. *Amer. Bot.* 29: 45-47. 1923.

5740. DEBBARMAN, P. M. A case of axial proliferation of the flower of *Nymphaea rubra* Roxb. *Jour. Indian Bot.* 3: 66-67. 1 pl. 1922.—The ovary was transformed into a hard hairy mass, and a short stalk bearing a rudimentary flower grew out from the axil of a petal.—*Winfield Dudgeon.*

5741. DEBBARMAN, P. M. Some observations on the anchoring pads of *Gymnopetalum cochinchinensis* Kurz and some other Cucurbitaceous plants. *Jour. Indian Bot.* 3: 52-57. 1 pl. 1922.—Under normal conditions the branching tendrils twine in the usual manner, without pad formation; but when coming into contact with a surface, the tendril tips respond to the contact stimulus and produce 2-5-celled trichomes which wedge into minute crevices and anchor the plant mechanically. There is no evidence of attachment by a mucilaginous secretion. Shade and moisture favor pad formation, and strong light and drought inhibit it. *Trichosanthes palmata* possesses similar anchoring pads.—*Winfield Dudgeon.*

5742. DUDGEON, WINFIELD. [Rev. of: MASCRÈ, M. *Recherches sur le developpement de l'anthère chez les Solanacées.* (Studies in the development of the anther in Solanaceae.) Thèse, Paris. 99 p., 101 fig. 1921.] *Jour. Indian Bot.* 3: 26-27. 1922.

5743. F[YSON], P. F. [Rev. of: ARBER, AGNES. *Leaves of the Farinosae.* *Bot. Gaz.* 74: 80-94. 1922.] *Jour. Indian Bot.* 3: 156. 1923.

5744. F[YSON], P. F. [Rev. of: ARBER, A. *On the development and morphology of the leaves of the palms.* *Proc. Roy. Soc. London, B.* 93: 249-261. 1922.] *Jour. Indian Bot.* 3: 156-157. 1923.

5745. F[YSON], P. F. [Rev. of: ARBER, AGNES. *On the nature of the blade in certain monocotyledonous leaves.* *Ann. Bot.* 36: 320-351. 1922 (see Bot. Absts. 12, Entry 1106).] *Jour. Indian Bot.* 3: 155-156. 1923.

5746. GHOSE, S. L. An example of leaf-enation in *Allium ursinum* L. *New Phytol.* 22: 49-58. Fig. 1-10. 1923.—In an abnormal leaf of *Allium ursinum* "doubling" was found in both the laminar and petiolar regions. Each blade shows one series of bundles, the orientation of which is opposite as is usual in leaf-enations. An example of leaf-enation is also described from *Xanthosoma appendiculatum*. A theoretical discussion is appended.—*I. F. Lewis.*

5747. HALBERG, F. Notes on Indian plant teratology. *Jour. Indian Bot.* 3: 1-9. 6 fig. 1922.—Abnormalities in flowers of *Calycopteris floribunda* Lamk. and *Habenaria grandiflora* Lindl. are described and figured.—*Winfield Dudgeon.*

5748. PFEIFFER, H. Vergleichende Anatomie der Blätter der Lagenocarpus-Arten. [A comparison of the leaf anatomy of the species of Lagenocarpus.] *Beih. Bot. Centrabl.* 2 Abt. 39: 436-445. Pl. 1. 1923.—Small sections of the leaf are sufficient to identify species. It may be possible to group the species in sections on morphological characters.—*L. Pace.*

5749. PROUTY, WILLIAM F. A more phenomenal shoot. *Jour. Elisha Mitchell Sci. Soc.* 37: 15. 1921.—A shoot of 1 season's growth of *Pawlonia tomentosa* was shown that was 21½ feet high, 10 inches thick at base, and had 24 internodes.—*W. C. Coker.*

5750. ROBERTSON, CHARLES. **Flowers and insects. XXIII. Pollination.** Bot. Gaz. 75: 60-74. 1923.—A summary is given of terms and their definitions which are related to pollination conditions. These terms are chiefly those of early authors, such as "adynamandry" of Kölreuter, referring to self-sterility. The author believes that the original flowers are perfect and entomophilous, and that in the evolution of angiosperms probably the most important condition was the diversification of station and habitat.—B. W. Wells.

5751. SAXTON, W. T. **Preliminary note on the life history of Cedrus deodara Loud.** Jour. Indian Bot. 3: 90. 1922.—Pollination occurs about the end of September (in the Himalayas) and fertilization about the end of May, 8 months later. Considerable spongy tissue is formed as the ovule develops. The female gametophyte at fertilization time is composed of exceedingly delicate tissue (more so than in *Pinus*). There are usually 3 archegonia, but occasionally as many as 6. The neck is variable, but is always composed of a considerable number of cells. The proembryo resembles that of *Pinus*, and the embryo is polycotyledonous.—Winfield Dudgeon.

5752. SOAR, ISABEL. **The structure and the function of the endodermis in the leaves of the Abietineae.** New Phytol. 21: 269-292. Fig. 1-12. 1922.—Methods for distinguishing suberin, lignocellulose, and cellulose are given. The material used included *Pinus* spp., *Picea excelsa*, *Pseudotsuga Douglasii*, *Larix europaea*, *Abies pectinata*, *Tsuga canadensis*, and *Pseudolarix Kaempferi*. Detailed study of leaf sections leads to the following conclusions. "The endodermis * * * has been shown to conform to a general plan, suberisation occurring always on the radial walls which are pitted, and on the transverse walls which are unpitted. The suberin is always deposited as a layer on each side of a lignocellulose core. The structure of the tangential walls varies in the different species described. They are often both lignified and suberised, but sometimes they, especially the inner tangential walls, consist of cellulose. Where these walls are suberised pits or breaks in the suberised membrane are present. In young leaves of *Pinus sylvestris* the development of the endodermal walls proceeds as follows: (1) cellulose, (2) lignocellulose, (3) lignocellulose with a surface layer of suberin. Thickening develops first in the radial walls. When the endodermal sheath is incomplete additional protective tissues are often found. Thus the growing leaf base of *Pinus* is protected by sclerotic scales, and the basal region of the leaf in *Picea* and *Abies* by additional layers of lignified hypodermis. The suberisation and lignification of the radial walls renders the endodermis relatively impervious to the passage of water through the walls alone. Thus the transpiration current must flow largely through the endodermal cell, and it is probable that the protoplasm exerts some control over the rate of flow." It is suggested that "the peculiar structure of the endodermis in the leaves of these gymnosperms is one of the factors which serve to retard transpiration."—I. F. Lewis.

5753. WILLIAMS, C. F. **The stems of grape hybrids.** Jour. Elisha Mitchell Sci. Soc. 38: 11-12. 1922.—The pattern of the phloem tissue and the character of the cork cambium were found to be specific in *Vitis vinifera* and *V. rotundifolia*. The F_1 hybrids of these 2 species showed intermediate characters of great variation, especially in regard to cork cambium.—W. C. Coker.

5754. YOCUM, L. EDWIN. **Some phases of structure and development of garden peas and white sweet clover seeds as related to hardness.** Jour. Elisha Mitchell Sci. Soc. 38: 76-83. 2 pl. 1922.—"In sweet clover and garden peas the Malpighian layer of cells begins to thicken very much about a week after fertilization. Thickenings are in ridges leaving crevices between. Sweet clover develops a light line which is more impermeable to water than the outer part of the cell. The pea does not have this region but in some cases has an impermeable cutin. Pectin is deposited in the cells around the micropyle at about the time of fertilization in the garden pea. The outer portion of the Malpighian cells of sweet clover and garden peas is a hemi-cellulose, very likely some form of pentose. The inner portion is cellulose.—The impermeable portion of a hard pea seed is located in the cutinized layer as compared with the light line in sweet clover."—W. C. Coker.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*L. H. TIFFANY, *Assistant Editor*

(See in this issue Entries 5443, 5923, 5954, 6036, 6099)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entry 6036)

5755. ANONYMOUS. [Note.] *Rev. Bryologique* 50: 16. 1923.—Attention is called to a meeting of the Botanical Society of France held in the Jura during the summer of 1919. Bryologists were represented by Hétier and Hillier, who pointed out a number of interesting mosses and hepatics in the region.—A. W. Evans.

5756. ANDREWS, A. LE ROY. [Rev. of: GYÖRFFY, ISTVÁN. *A Molendoák fajai tagolódása és rokonsága összehasonlító anatómiai és fejlődéstani vizsgálatok alapján.* (Investigations on Molendoa.) *Math. Term. Tud. Ert.* 38: 344-351. 1921 (see Bot. Absts. 12, Entry 5763.) *Bryologist* 25: 108-109. 1922.—The reviewer outlines the general content of the article, commends the author's methods, and expresses the hope that the completed monograph will do much to clarify a little known region of the moss-system.—E. B. Chamberlain.

5757. ARNELL, H. WILH. *Bryum* (Cladodium) *vestmannum* Arnell, nova species. *Bot. Notiser* 1923: 293, 294. 1923.—The species here proposed as new was based on material collected in the province of Västmanland, Sweden, by C. A. Törnlund in 1920. There is included under it a var. *norbergense* Arnell from the same province, described in 1918 as *Bryum inclinatum* var. *norbergense* Arnell (see Bot. Absts. 7, Entry 1079).—A. W. Evans.

5758. BRINKMAN, A. H. List of British Columbia hepatics. *Canadian Field Nat.* 37: 94-96. 1923.—A list of 170 hepatics compiled from various sources is given, no definite localities being mentioned. The list includes 31 species first discovered in British Columbia by the author.—W. H. Emig.

5759. CULMANN, P. Contribution à la flore bryologique du bassin supérieur de l'Alagnon (Cantal). [Contribution to the bryological flora of the upper valley of the Alagnon (Cantal).] *Rev. Bryologique* 50: 9-15. 1923.—The region is in the department of Cantal in Central France, especial attention having been paid to a series of mountain ravines. The rocks of the district are largely volcanic, but gneiss and limestone are present in certain localities, and calciphilous species are found in some of the volcanic habitats. The species reported includes not only those found by the author but also those recorded in earlier works, particularly Héribaud's *Muscinees d'Auvergne*, published in 1899. In the present portion of the paper, which is to be continued, 39 hepatics are listed with full data regarding stations. A few critical remarks are interspersed and, in connection with *Marsupella Sprucei* and *M. ustulata*, the differential characters are discussed at length, the conclusion being reached that these are too vague and inconstant to separate the species.—A. W. Evans.

5760. DIXON, H. N. *Porotrichum angustifolium* in Ireland. *Irish Nat.* 32: 45-47. 1923.—This endemic British moss, originally found in Derbyshire, has been recorded from Ireland, probably from County Antrim.—W. E. Praeger.

5761. FLEISCHER, MAX. Kritische Revision von Carl Müllerschen Laubmoosgattungen. [Critical revision of Carl Müller's genera of mosses.] *Hedwigia* 63: 209-216. 1922.—In the present part the same plan is followed as in the preceding part [see Bot. Absts. 8, Entry 447],

Müller's determinations being given in one column and the author's in another. The following genera as understood by Müller are taken up: *Remyella*, *Lindigia*, *Gyrosine*, *Patellidium*, *Campylodontium*, *Platygyrium*, *Struckia*, *Pylaisia*, *Entodon*, *Pilosium*, *Cyathophorum*, *Cyathophorella*, *Mononeurium*, *Euglossophyllum*, *Hypopterygium*, *Mniadelphus*, *Hepaticina*, *Hookeria*, and *Lepidophyllum*. As in the preceding part several of Müller's species are reduced to synonymy, and many new combinations are made necessary by the transference of species.—A. W. Evans.

5762. GOLA, G. Le epatiche raccolte dal Dott. G. B. De Gaspari nella Terra del Fuoco sud-occidentale. [The hepatics collected by Dr. G. B. De Gaspari in southwestern Tierra del Fuego.] *Nuovo Gior. Bot. Ital.* 29: 162-175. Pl. 1, 2. 1923.—The present report is based on a collection made in the colder parts of Tierra del Fuego, many of the specimens having been found in the vicinity of glaciers and the streams flowing from them. The species in condition to be determined number 74 of which the following 17 are proposed as new and figured: *Anastrophyllum Pampinini*, *Blepharostoma acanthifolium*, *B. Pigafettoanum*, *Cephalozia* (*Cephaloziella*) *magellanica*, *Frullania* (*Diastoloba*) *microcaulis*, *Jamesoniella fuegiensis*, *J. glacialis*, *Lophocolea atra*, *L. Baccarinii*, *Lophozia magellanica*, *Plagiochila De Gasparii*, *P. marginata*, *P. microdonta*, *Riccardia laminaris*, *Schistochila De Gasparii*, *S. spinosissimum*, and *Solenostoma fuegiense*. In addition to these a new variety is described under each of the following species: *Isotachis georgiensis*, *I. subtrifida*, and *Lepicolea Scolopendra*. For *Plagiochila remotidens* Steph. the older name *P. ambigua* De Not. is taken up. Under each of the species listed the usual data regarding stations are given.—A. W. Evans.

5763. GYÖRFFY, ISTVÁN. A Molendoák fajai tagolódása és rokonsága összehasonlító anatómiai és fejlődéstani vizsgálatok alapján. [Investigations on Molendoa.] *Math. Term. Tud. Ert.* 38: 344-351. 1921.—The paper deals with the problematical moss-genus *Molendoa* and is preliminary to a more complete monograph (Versuch einer Monographie der Gattung *Molendoa*), which the author has nearly ready for publication. Ten previously described species are to be recognized, together with 7 new ones, the names of which alone are here given. The 3 European species are connected by rare transitional forms, and the relationship of all the forms of these species is represented graphically by a diagram. The author speaks also of forms appearing somewhat intermediate between *Molendoa* and *Hymenostylium* and thinks that the relationship between these two genera is closer than between *Molendoa* and *Anoetangium*. [See also Bot. Absts. 12, Entry 5756.]-A. Le Roy Andrews.

5764. HAUPT, ARTHUR W. Embryogeny and sporogenesis in *Reboulia hemisphaerica*. *Bot. Gaz.* 71: 446-453. Pl. 33, 11 fig. 1921.—The material was collected at Hamilton and Dakota, Illinois, and at Rome, Indiana. In the development of the sporophyte the epibasal segment gives rise to the capsule and stalk, while the hypobasal segment gives rise to the foot. No octant stage is formed, as in certain other Marchantiaceae, but the epibasal segment usually divides by 2 transverse walls, before vertical walls are laid down, the young sporophyte thus consisting of a row of 4 cells. These results are in essential agreement with those recently reported by Woodburn (see Bot. Absts. 4, Entry 1045). In the later stages the sporogenous tissue is soon delimited from the amphithecum and gives rise directly, after a series of divisions, to spore mother cells and elater primordial cells, which are thus homologous structures. The walls of the sporogenous cells break down into a mucilaginous mass and the protoplasts of the spore mother cells exhibit an amoeboid movement before forming new cell walls. In the tetrad stage the walls become differentiated into intine and exine and an epispore, which finally gives rise to a "tuberculate" spore-surface, is laid down on the outside. In the elaters the development of the 2 spiral bands "is accompanied by a condensation and ultimate disappearance of the protoplasm."—A. W. Evans.

5765. HAUPT, ARTHUR W. Gametophyte and sex organs of *Reboulia hemisphaerica*. *Bot. Gaz.* 71: 61-74. 21 fig. 1921.—The material was collected at Rome, Indiana, by W. J. G. Land. The author recognizes a single species of *Reboulia*, the polymorphic *R. hemi-*

sphaerica. The thallus grows by means of a cuneate apical cell and bears 2-ranked ventral scales without appendages. The primary air spaces originate by centripetal splittings and become subdivided by secondary partitions. The pores opening into the chambers are simple on the vegetative thallus and male receptacle but barrel-shaped on the female receptacle. On the sessile male receptacle the antheridia develop in acropetal succession according to the method characteristic of the Marchantiales. On the stalked female receptacle several growing points are organized, each of which usually gives rise to a single archegonium, more rarely 2. In the development of the archegonium the initial divides by a transverse wall, the outer cell then dividing by 3 vertical walls in the usual way; the neck canal cells number 18-20 at maturity.—A. W. Evans.

5766. HENRY, R. L'abbé Boulay et l'étude des Sphaignes françaises. [Abbé Boulay and the study of the French Sphagna.] Rev. Bryologique 50: 1-4. 1923.—The author quotes passages from Boulay's letters, dating from 1904 and 1905, in which certain species of *Sphagnum* are discussed. These passages bring out the fact that Boulay regarded as non-valid many of the species proposed by Warmstorf and other recent bryologists.—A. W. Evans.

5767. KASHYAP, SHIV RAM. A long-lost liverwort. Jour. Indian Bot. Soc. 3: 181. 1923.—In 1849 Griffith described and figured a curious liverwort from Assam under the name *Mono-selenium tenerum*. Goebel in 1910 described an apparently identical plant from Canton, China. It has now been rediscovered in Manipur, Assam.—Winfield Dudgeon.

5768. KASHYAP, SHIV RAM, and SHIVA KANT PANDE. A contribution to the life-history of *Aneura indica* St. Jour. Indian Bot. Soc. 3: 79-89. Pl. 1-7. 1922.—*Aneura indica*, one of the few Indian species of *Aneura*, is very variable in the shape and structure of the thallus and in the form of the upper epidermal cells. It is strictly dioecious, the development of the sex organs agreeing with the descriptions of Campbell and Clapp. The sporophyte remains enclosed by the calyptra till a late stage. The elaterophore extends to about the middle of the capsule, and the elaters are attached in a spreading manner. A mature sporophyte had a seta 6 mm. long and a cylindrical capsule 2.5 mm. long. The capsule wall is 2-layered, and the cells of both layers possess broad, brown, annular bands. The spores are 20-30 μ in diameter, and the elaters are about 19 μ long, with a single broad spiral band. The chromosome numbers are 6 and 12.—Winfield Dudgeon.

5769. RÖLL, JULIUS. Torfmoose der Niederlausitz. [Peat mosses of the Lower Lausitz.] Hedwigia 64: 19-29. 1922.—The present report is based on 2 collections of *Sphagnum* made by the author in June, 1920, in the Lower Lausitz, a district of southern Prussia just north of Saxony. The prevailing vascular plants of the localities investigated are briefly indicated, and the peat mosses collected are listed in detail, definite stations being given in each case. The lists include 26 distinct species of *Sphagnum*, together with numerous varieties and forms.—A. W. Evans.

5770. THÉRIOT, I. Gyroweisla ou Weisiodon? Rev. Bryologique 50: 4-6. 1923.—Reference is made to a recent paper by Andrews (see Bot. Absts. 12, Entry 4167), in which it is shown that the generic name *Gyroweisla* Schimp., being antedated by *Weisiodon* Schimp., ought to be discarded according to the current rules of nomenclature. Since, however, *Gyroweisla* has been in use for many years and since Schimper himself preferred it to *Weisiodon*, it is recommended that an exception to the rules be made and that the name *Gyroweisla* be retained.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*DONALD S. WELCH, *Assistant Editor*

(See also in this issue Entries 5471, 5816, 5817, 5821, 5825, 5826, 5827, 5832, 5833, 5834, 5836, 5842, 5844, 5845, 5849, 5892, 5898, 5924, 5947, 5975, 5982, 5998, 6032)

FUNGI

5771. ALLEN, W. B. [Rev. of REA, CARLETON. *British Basidiomycetae, a handbook of the larger British fungi.* xii + 799 p. Cambridge University Press: 1922 (see Bot. Absts. 12, Entry 1978).] Trans. British Mycol. Soc. 8: 254-256. 1923. [See also Bot. Absts. 12, Entry 5049.]

5772. BATHELLIER, JEAN. Sur les jardins à champignons de l'Eutermes Matangensis. [On the fungous gardens of Eutermes Matangensis.] Compt. Rend. Acad. Sci. Paris 176: 129-131. 1923.—The fungus which is so cultivated is found to be a Xylaria.—C. H. Farr.

5773. BOSE, S. R. Geographical distribution of the Bengal species of Polyporaceae along with a short history of them in Bengal. Jour. Indian. Bot. 3: 19-21. 1922.—Incomplete knowledge of the fungus flora of the world renders a general view of distribution impossible. Polyporaceae apparently are widespread wherever conditions are suitable. Among the Bengal Polyporaceae some are practically cosmopolitan, as *Fomes leucophaeus*, *Polystictus versicolor*, *Ganoderma lucidus*, and *Polyporus gilvus*; others appear to have a strikingly discontinuous distribution, as *Polystictus protea*, *Trametes lactinea*, *T. occidentalis*, *Daedalea quercina*, and *Polyporus luzonensis*; others are restricted to British India and the eastern tropics, as *Polystictus Berkleyi*, *P. suboccidentalis*, *Polyporus Emerici*, *P. fumoso-olivaceus*, *Merulius similis*, and *Fomes annularis*; and recent discoveries in Bengal extend the known range of distribution of several species, as *Lenzites alutacea*, *Polyporus Rhizophore*, *P. anebus*, and others.—A brief review is given of the scattered and fragmentary literature on Bengal Polyporaceae.—Winfield Dudgeon.

5774. CHARDON, CARLOS E. Un nuevo "smut" de Puerto Rico. [A smut new to Porto Rico.] Rev. Agric. Puerto Rico 64: 21-23. 1 fig. 1921.—*Thecaphora pustulata* Clinton attacking *Bidens leucantha* in Porto Rico is described as new to the Island. The fungus deforms the leaves and stems of the host.—John A. Stevenson.

5775. CHRISTIANSEN, M. General Mukormykose hos Svin. [General mucormycosis in swine]. K. Vet. og. Landbohøjskoles Aarsskr. 1922: 131-191. 2 pl., fig 1-11. 1922.—*Rhizopus (equinus* Const. & Lucet. ?) and *Absidia ramosa* var. *Rasti* Lendner have been isolated from peritoneal and other tumors of swine. Rabbits have been successfully infected with pure cultures. A German summary is given.—Ernst Gram.

5776. COKER, W. C. Some fungi new to North America or the South. Jour. Elisha Mitchell Sci. Soc. 37: 13-14. 1921.—The following are reported from Chapel Hill, North Carolina: *Sirobasidium sanguineum*, *Pholiota praecox* (a remarkable form of this species lacking the veil), *Tricholoma venenata*, *Lepiota caerulescens*, *Apodachlya brachynema*.—W. C. Coker.

5777. COKER, W. C., and H. C. BEARDSLEE. The Collybias of North Carolina. Jour. Elisha Mitchell Sci. Soc. 37: 83-107. Pl. 1 (col.), 4-23. 1921.—Twenty-two species are treated with *C. lilacina* described as new.—W. C. Coker.

5778. COKER, W. C., and H. C. BEARDSLEE. The Laccarias and Clitocybes of North Carolina. Jour. Elisha Mitchell Sci. Soc. 38: 98-126. Pl. 1. (col.), 7-33. 1922.—Four species of *Laccaria* and 20 of *Clitocybe* are keyed and described.—W. C. Coker.

5779. COKER, W. C., and F. A. GRANT. A new genus of water mold related to *Blastocladia*. Jour. Elisha Mitchell Sci. Soc. 37: 180-182. Pl. 32. 1922.—This plant (*Septocladia dichotoma* Coker and Grant) was found on a piece of bone in a pool at Chapel Hill, North Carolina. It differs from *Blastocladia* in possessing a septate thallus.—H. M. Fitzpatrick.

5780. EICHELBAUM, F. Die essbaren Pilze der Niederelbe und Trave. Zweites Stück. [The edible fungi of the Lower Elbe and the Trave. Second part.] Verhandl. Naturw. Ver. Hamburg III, 26: 1-28. 1918 [1919].—The 1st part of this work was published in 1917 (see these transactions III, 24: 101-132. 1916 [1917]) and called attention to the greatly increased interest in the edible mushrooms among the German populace during the war. The author there attempted to supply the southern part of Schleswig-Holstein with a list of species that he had personally tested with respect to edibility. This list includes 5 ascomycetes and 101 basidiomycetes. Under each he described the habitat, the degree of frequency, and the distinctive features (especially in the case of those likely to be confused with poisonous forms), and gave both Latin and German names, adding references to published illustrations as far as possible.—In the 2nd part he gives a similar list of 103 additional species which he has subsequently tested. Of non-edible or otherwise objectionable species he recognizes 7 groups, as follows: (1) those containing a single non-volatile poison, not destroyed by boiling or drying; (2) those containing 2 such poisons, sometimes but not always counteracting each other; (3) those usually harmless but said to act poisonously sometimes; (4) those containing a volatile poison, destroyed by boiling; (5), those which are bitter when fresh, the bitterness disappearing upon boiling; (6) those which are edible only while young; and (7) those which are objectionable on account of bad taste or odor. The list includes representatives of all these groups except the 1st and 2nd.—A. W. Evans.

5781. ELLIOTT, JESSIE S. BAYLISS, and OLIVE P. STANSFIELD. Records of Fungi Imperfecti. Trans. British Mycol. Soc. 8: 249-254. Fig. 1-4. 1923.—*Septocylindrium leucum*, *S. melleum*, *Patellina caesia*, and *P. diaphana* are described as new species. Several other species that are new to the British Isles or are rare are discussed.—W. B. McDougall.

5782. F[YSON], P. F. [Rev. of: BOSE, S. R. One new species of Polyporaceae and some polypores of Bengal. Ann. Mycologici 19: 129-131. 1921. (see Bot. Absts. 12, Entry 1954).] Jour. Indian Bot. 3: 155. 1923.

5783. HAWLEY, H. C. Notes on some British pyrenomycetes. Trans. British Mycol. Soc. 8: 226-230. 1923.—This paper consists of short notes on 19 pyrenomycetes, 9 of which are new to the British Isles.—W. B. McDougall.

5784. HIGGINS, B. B. Notes on the morphology and systematic relationship of *Sclerotium Rolfsii* Sacc. Jour. Elisha Mitchell Sci. Soc. 37: 167-172. Pl. 29. 1922.—No fruiting bodies are known but an affinity to the basidiomycetes is indicated by the septate, binucleate mycelium and by the presence of clamp connections. On fleshy plants, such as cantaloupe, growth is profuse and sclerotia are abundantly formed. The mature sclerotia are 0.5-1.5 mm. thick, with a thin corky surface layer, a parenchymatous subcortical layer, and a filamentous central region. On nutrient media the inner filaments sprout through the outer layers to renew mycelial growth. Cultures from different sclerotia allowed to intermingle showed that mixing of strains was not necessary for the production of sclerotia. When dry the sclerotia remain viable for more than 2 years, but it is thought that they do not survive long on moist earth in the field.—W. C. Coker.

5785. KNUDSEN, S. Om Gær og Skimmel i sukret kondenseret Mælk. [Yeasts and molds in sweetened condensed milk.] K. Vet. og Landbohøjskoles Aarsskr. 1922: 282-295. 1922.—In Danish sweet condensed milk a yeast was found, and in Dutch sweet condensed milk 2 yeasts, presumably identical with those described by Pethybridge from Irish condensed milk,

by Miss Hiscox from English condensed milk, and similar to one found by Hammer in American condensed milk. *Aspergillus glaucus* and *Catenularia fuliginea* by their autodigestion cause the formation of "buttons" in condensed milk.—*Ernst Gram*.

5786. LÉGER, L., et E. HESSE. Sur un champignon du type *Ichthyophonus* parasite de l'intestin de la Truite. [A fungus of the *Ichthyophonus* type parasitic on the intestines of trout.] Compt. Rend. Acad. Sci. Paris 176: 420-422. 1923.—A new species, *Ichthyophonus intestinalis*, is described. It is found throughout the digestive tract. Its life history in relation to that of the trout is discussed.—*C. H. Farr*.

5787. McLEAN, R. C. A new species of *Sigmoideomyces* Thaxter. Trans. British Mycol. Soc. 8: 244-246. Pl. 12. 1923.—*Sigmoideomyces divaricatus*, found on the surface of soil in a pot in the greenhouse at University College, Cardiff, is described as new. This is the 3rd species of the genus to be described, the 1st being *S. dispiroides* Thaxter from Tennessee and the 2nd *S. clathroides* described by Mrs. Bayliss Elliott from Birmingham. *S. clathroides* was found by Mrs. Elliott to be correlated with the presence of dead earthworms in the soil but no such connection was found in the case of *S. divaricatus*.—*W. B. McDougall*.

5788. MOUNCE, IRENE. The production of fruit-bodies of *Coprinus comatus* in laboratory cultures. Trans. British Mycol. Soc. 8: 221-226. 1923.—Attempts to obtain fruit-bodies in cultures of horse dung were unsuccessful; but when the mycelium was grown upon a sterilized mixture of horse dung and sawdust buried beneath a thick layer of soil at the bottom of deep culture vessels perfect fruit-bodies were obtained in 9-10 months.—*W. B. McDougall*.

5789. PETCH, T. Parasites of scale-insect fungi. Trans. British Mycol. Soc. 8: 206-212. 3 fig. 1923.—Three genera of fungi which are parasitic on entomogenous fungi are discussed. The following species are described as new: *Sirospora chlorostoma*, *Sirosperma sparsum*, *Byssostilbe fusca*, and *B. tomentosa*.—*W. B. McDougall*.

5790. PETCH, T. The genus *Cladosterigma* Pat. Trans. British Mycol. Soc. 8: 212-215. 1923.—*Microcera Clavariella* Speg. is a *Cladosterigma* and seems to be identical with *C. fusisporum*. It must therefore be known as *Cladosterigma Clavariella*. A new genus, *Trichosterigma*, of the family Stilbaceae, is described to accomodate 3 species of entomogenous fungi found in Ceylon. These 3 species are described as new with the following names: *Trichosterigma clavisporum*, *T. arachnophilum*, and *T. attenuatum*.—*W. B. McDougall*.

5791. STRATTON, ROBERT. The Fimetariales of Ohio. (The Ascomycetes of Ohio. III.) Ohio Biol. Surv. 3: 75-144. Pl. 1-18. [Ohio State Univ. Bull. 26: no. 5.] 1921.—No previous study of the species growing in Ohio had been made, and only a single species had been recorded for the State. Collections of dung of various animals were sent in by 12 persons from as many different localities. Cultures were made in moist chambers, and the species described were grown, for the most part, in these cultures. These species are 6 from the genus *Chaetomium* of the Chaetomiaceae; and 6 of *Fimetaria*, 14 of *Pleurage*, 2 of *Delitschia*, and 6 of *Sporormia* of the Fimetiaceae. New species are: *Fimetaria tetraspora*, *F. pilosa*, *Pleurage hyalopilosa*, and *P. immersa*. The diagnoses are accompanied by keys. The 18 plates contain more than 200 figures. Glossary, bibliography, and index are appended.—*Bruce Fink*.

5792. ULBRICH, E. *Stropharia viridula* Schaef. var. *exanulosa* Ulbrich n. var. Hedwigia 63: 217-218. 1922.—The plant was found in the Berlin Botanical Garden, and in areas near the city, growing on stumps and on decaying vegetable matter in soil. The annulus, a constant character of the parent species, is absent in the variety. A partial veil is present in young specimens, but this adheres to the margin of the pileus as the pileus expands. The stipe and the pileus are larger than in the species. Other minor points of difference are included in the 12-line description.—*Bruce Fink*.

5793. WAKEFIELD, E. M., and A. A. PEARSON. Some additional records of Surrey resupinate hymenomycetes. Trans. British Mycol. Soc. 8: 216-221. Fig. 1-8. 1923.—Several species of resupinate fungi are described and discussed and *Tulasnella allantospora* and *T. microspora* are described as new.—W. B. McDougall.

5794. WEIR, JAMES R. *Poria papyracea* (Schw.) Cke. Phytopathology 13: 187. 1923.—Several collections of this rare fungus are reported.—B. B. Higgins.

5795. WOLF, FREDERICK A. The fruiting stage of the Tuckahoe, *Pachyma cocos*. Jour. Elisha Mitchell Sci. Soc. 38: 127-137. Pl. 34-37. 1922.—The well known but puzzling Tuckahoe is shown to be the sclerotium of a *Poria* and is given the name *Poria cocos*. Fruiting surfaces were obtained on fresh sclerotia after soaking and exposure to light. Fruiting was also obtained on the surface of pieces of the inside of the sclerotia which were placed in test tubes. The development of the sclerotia inside the pine roots is described.—W. C. Coker.

5796. ZIKES, HENRICH. Über die Perithizenbildung bei *Aspergillus Oryzae*. [The formation of perithecia in *Aspergillus Oryzae*.] Centralbl. Bakt. II Abt. 56: 339-343. Fig. 1-3. 1922.—Mature perithecia of *Aspergillus Oryzae* were produced when growing the fungus on a gelatin medium prepared according to Woltje's formula. The conidial stage was again obtained by growing single ascospore cultures on sugar media. The fungus was also studied on various modifications of Woltje's medium. In this connection budding structures were observed.—Anthony Berg.

LICHENS

5797. HERZOG, TH. VON. Beitrag zur Flechtenflora von Bolivia. [Contribution to the lichen flora of Bolivia.] Hedwigia 63: 263-268. 1922.—The lichens considered are part of a general collection of plants made in 1910 and 1911, and were determined by Zahlbruckner. Sixty-three species and subspecies are listed with localities, substrata, and occasionally other data. *Cladonia gracilis polyclada* Zahlbr. is described as new. Since little is known of the lichen flora of the area, the contribution is of special interest to lichenists and phytogeographers.—Bruce Fink.

5798. HILLMAN, JOHANNES. Übersicht über die Arten der Flechtengattung *Xanthoria* (Th. Fr.) Arn. [A survey of the species of the lichen genus *Xanthoria*.] Hedwigia 63: 198-208. 1922.—A key is given followed by descriptions and notes on distribution of the 10 known species, together with a considerable number of subspecies. *Xanthoria parietina* (L.) Th. Fr. and *X. candelaria* (L.) Arn. are distributed over all the grand divisions of the earth; *X. polycarpa* (Hoffm.) Flæg. is found in Europe, Africa, and America; *X. fallax* (Hepp) Arn., in Europe and Africa; *X. lobulata* (Floerke) Bouly de Lesd., in Europe; *X. spinulosa* (Krempelh.) Hillm., in Australia; *X. polycarpoides* Stizenb., in Asia; *X. flammea* (L.) Hillm., in Africa; and *X. ramulosa* (Tuck.) Hillm. and *X. modesta* Zahlbr. in America.—Bruce Fink.

5799. SMITH, ANNIE LORRAIN. Recent work on lichens. Trans. British Mycol. Soc. 8: 193-206. 1923.—This paper consists of a summary of the publications on lichens that were unavoidably omitted from the author's handbook, Lichens, and of those that have appeared since the handbook went to press. The paper closes with a bibliography of 44 titles.—W. B. McDougall.

BACTERIA

5800. ANONYMOUS. [Rev. of: LIESKE, RUDOLPH. *Bakterien und Strahlpilze*. (Bacteria and Ray fungi.) In: *Handbuch der Pflanzenanatomie*. Edited by K. LINSBAUER. II Abt., 1 Teil: Thallophyten, Band 6. iv + 88 p. Gebrüder Borntraeger: Berlin, 1922.] Nature 111: 355. 1923.

5801. CONN, H. J. General characteristics of the soil flora. [Abstract.] Absts. Bact. 7: 84-85. 1923.

5802. DUDGEON, WINFIELD. [Rev. of: HELLER, HILDA HEMPL. Phylogenetic position of bacteria. Bot. Gaz. 72: 390-396. 1921.] Jour. Indian Bot. 3: 118. 1922.

5803. LÖHNIS, F., AND N. R. SMITH. Studies upon the life cycles of bacteria—part II; life history of *Azotobacter*. Jour. Agric. Res. 23: 401-423. Pl. 1-9. 1923.—Experimental tests with 30 strains of *Azotobacter* and several cultures of related bacteria show that only 2 species of this genus have been characterized thus far: *A. chroococcum* and *A. agile*. Members of this genus are characterized by 7 cell types differing physiologically as well as morphologically. These types are (1) large, non-sporulating, globular, oval or rod-like cells, white, yellow, or brown with polar or peritrichous flagella, able to act as gonidia and microcysts; (2) coccoid cells, white, yellow or pink, the vegetative growth of regenerative cells; (3) dwarfed cell types, white, yellow, or red, the vegetative growth of the gonidia; (4) irregular, fungoid cells, yellow, orange, or white or pink; (5) small non-sporulating rods; (6) small sporulating rods; (7) large sporulating cells, white, yellow or brown. Many of these stages have been shown to be identical with previously described species. All types have been transformed into each other. The formation of symplasm and the regeneration of new cells proceed in the manner described in a previous article. The reproductive organs of *Azotobacter* are (1) gonidia; (2) regenerative bodies and exospores, produced in 2 ways, either in lateral or terminal positions, or from the symplasm; (3) arthospores formed from the rod-like or fungoid cells; (4) microcysts, a small globular resting cell; and (5) endospores. Gonidia form the basis for the development of regenerative bodies. Conjunction occurred regularly before the formation of gonidia, regenerative bodies, and both endospores and exospores.—W. H. Burkholder.

5804. MILDENBERG, HERMANN. Über einen blauen Farbstoff bildenden *Bacillus* aus der Luft und seine Beziehungen zum *Bacillus* der blauen Milch [A blue pigment-producing bacillus from the air and its relation to the bacillus of blue milk.] Centralbl. Bakt. II Abt. 56: 309-328. 1922.—This organism is compared in detail with *B. cyanogenus*. It differs in several respects from the blue pigment producers and is thought to be an undescribed organism.—Anthony Berg.

5805. SMALL, JAMES C., and LOUIS A. JULIANELLE. Biological and serologic studies of *Bacillus mucosus* group. Comparison of strains from granuloma inguinale with strains from respiratory tract. Jour. Infect. Diseases 32: 456-470. 1923.—Numerous strains of bacteria of the mucosus group were studied morphologically, for biochemical reactions, for growth in the presence of tartar emetic, and for serologic reactions, with the view of differentiating the strains obtained from lesions of the respiratory tract from those from lesions of inguinal granuloma. The effects of tartar emetic on growth was the only test which distinguished them. Granuloma strains were more resistant to the growth-inhibiting effects of tartar emetic than were the respiratory strains. Lack of motility, presence of capsules, gram-negative staining, inability to produce indol from peptone, the absence of gelatin-liquifying properties, inability to produce creatinin from peptone, ability to reduce nitrates, and to form ammonia and amino-acids from peptone are characters common to the mucosus group, but not useful for identifying subgroups.—R. L. Starkey.

5806. WOLF, F. A. Studies on fermentation of rare sugars by plant pathogenic bacteria. Jour. Elisha Mitchell Sci. Soc. 38: 12-13. 1922.—“In the case of two leafspot diseases of tobacco commonly designated as wild-fire and angular leafspot caused by *Bacterium tabacum* and *B. angulatum* respectively, both are able to form acid from dextrose and saccharose but not from glycerine and lactose, but the former attacks in addition mannitol and galactose whereas the latter is without action on them. A similar specialization obtains in the case of two leaf-spot organisms, *Bacterium glycineum* and *B. sojae* from soybean. This study emphasizes the necessity of employing in phytopathological studies the rare sugars for diagnostic purposes.”—W. C. Coker.

5807. YURI, ETSUO. Final hydrogen ion concentration in the paratyphoid enteritidis group. Jour. Infect. Diseases 32: 479-480. 1923.—The final H-ion concentration of dextrose broth cultures could not be used to distinguish the several types of paratyphoid-enteritidis bacilli. The pH varied within narrow limits (4.6-4.9).—R. L. Starkey.

MYXOMYCETES

5808. GUNN, W. F. Irish Mycetoza. Irish Nat. 29: 76. 1920.—*Lamproderma scintillans* and *Physarum staminipes* are each recorded for the 2nd time from Ireland.—W. E. Praeger.

5809. VONWILLER, P. Über den Bau des Plasmas der niedersten Tiere. II. *Lycogala epidendron*. [Structure of protoplasm of simplest animals.] Arch. Protistenk. 40: 1-15. 1 pl., 3 fig. 1919.—A review of the literature is followed by a description of the microscopic structures of *Lycogala epidendron*.—An account of spore formation is included.—R. P. Hall.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See also in this issue Entries 5457, 6036)

5810. BANDULSKA, H. On the presence of an Abietean conescale, *Pityolepis durleyensis*, sp. n. in the Bournemouth Eocene beds. Ann. and Mag. Nat. Hist. 11: 705-707. Fig. 1. 1923.—A cone-scale belonging to the middle Eocene period was found at Durley Chine, Bournemouth. The points of similarity and difference between the fossil and cone-scales of living species of *Abies*, *Picea*, and *Pseudotsuga* are discussed. Since it does not quite agree with any one of these, the name *Pityolepis durleyensis* is suggested.—H. H. Clum.

5811. BERCKHEMER, FRITZ. Über die Böttinger Marmorspalte sowie über Funde fossiler Pflanzen aus einigen Tuffmaaren der Alb. [The marble fissure at Böttingen and discoveries of fossil plants in some of the tufas of the Alb.] Jahresh. Ver. Vaterländ. Naturk. Württemberg 77: 66-78. 2 fig. 1921.—The account of the marble at Böttingen is largely geological in character, but the author notes the occurrence of several angiospermous fossils, notably *Podogonium Knorri* Al. Br., as indicative of the Miocene. From the tufas of Grabenstatten, Hengen, Erkenbrechtsweiler, and other localities in the Alb district of southern Germany he describes and figures a well-preserved *Juglans* nut, perhaps referable to *J. nur taurinensis* Ad. Brong., and records the occurrence of 5 other dicotyledonous and 3 monocotyledonous genera.—A. W. Evans.

5812. COCKERELL, T. D. A. [Rev. of: KNOWLTON, F. H. The Laramie flora of the Denver Basin, with a review of the Laramie problem. U. S. Geol. Surv. Professional Paper 130. 176 p., 28 pl. 1922.] *Torrey* 23: 52-53. 1923.—The very complete historical summary brings out the fact that this area has a single distinct flora, existing under warm and moist conditions. The salient feature is the great representation of *Ficus*, with 40 species. *F. navicularis* Ckll. is re-named *F. Knowltoni* Ckll.—J. C. Nelson.

5813. COMPTON, R. H. Botanical aspects of Wegener's hypothesis. *Nature* 111: 533-534. 1923.—The author was quoted (*Nature* 111: 131) as regarding the evidence completely opposed to the theory. The ancient phyla are generally valueless as indicating former land connections, and the distribution of the modern groups took place at a later date; the botanical evidence therefore provides no test.—O. A. Stevens.

5814. F[YSON], P. F. [Rev. of: SEWARD, A. C. A study in contrasts: the past and present distribution of certain ferns. Taken from the published minutes of the Linnean Society of London, for June 1st, 1922 (see Bot. Absts. 12, Entry 5112).] *Jour. Indian Bot.* 3: 121-123. 1922.

PATHOLOGY

FREDERICK V. RAND, *Editor*LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 5290, 5292, 5297, 5302, 5304, 5309, 5310, 5312, 5316, 5317, 5320, 5341, 5342, 5344, 5350, 5356, 5364, 5369, 5372, 5734, 5407, 5471, 5507, 5522, 5530, 5555, 5565, 5567, 5571, 5578, 5614, 5621, 5623, 5627, 5628, 5642, 5643, 5654, 5659, 5667, 5677, 5697, 5699, 5714, 5736, 5740, 5747, 5774, 5775, 5784, 5794, 5795, 5806, 5936, 5938, 5973, 5975, 6000, 6004, 6030, 6031, 6032)

DISEASES CAUSED BY FUNGI

5815. ANONYMOUS. Panama disease. Jour. Jamaica Agric. Soc. 26: 454-456. 1922.—The Panama disease of bananas, caused by *Fusarium cubense*, first appeared in Jamaica in 1911, being reported simultaneously from 3 localities. Control measures followed in Jamaica are as follows: diseased plants are dug up and burned; a ring of healthy plants about the diseased one is also dug up and destroyed; the area thus cleared is fenced and kept clear of plant growth, particularly of cocoes [*Colocasia*].—*John A. Stevenson*.

5816. BAEZ, HORACIO. La rulla o polvillo del trigo. [Wheat rust.] Defensa Agric. [Uruguay] 3: 163-167. 5 fig. 1922.—Black rust (*Puccinia graminis Tritici*) has been very severe on wheat in Uruguay during the past season. The disease appears in February and March and disappears in June. It comes from the south and passes on to Brazil.—The uredostage only is found. The life-history of the fungus is described.—*John A. Stevenson*.

5817. BEAUVERIE, J. Sur les rapports existant entre le développement des rouilles du blé et le climat. [The relation between climate and development of wheat rusts.] Compt. Rend. Acad. Sci. Paris 176: 529-531. 1923.—Three rusts, *Puccinia graminis*, *P. glumarum*, and *P. triticea* are studied. It is concluded that *P. glumarum* appears when the spring is damp; *P. triticea* is the rust of dry years; and *P. graminis*, of wet years. Lists of varieties are given under the following heads: very resistant; fairly resistant; susceptible; very susceptible; most susceptible.—*C. H. Farr*.

5818. BIOLETTI, FREDERIC T. Make mildew scarce. Associated Grower 34: 7, 18. 3 fig. 1922.—Grapevines affected with powdery mildew [*Uncinula necator* (Schw.) Burr.] should be sulphured: (1) when the young runners are about 10 inches long; (2) at blossoming time; (3) if necessary, after the grapes have set. The finest ground sulphur should be used, and applied evenly, not too heavily, and only when the leaves are dry.—*E. L. Overholser*.

5819. BURGER, O. F., E. F. DE BUSK, and W. R. BRIGGS. Preliminary report on controlling melanose and preparing Bordeaux-oil. Florida Agric. Exp. Sta. Bull. 167. 123-140. Fig. 28-32. 1923.—Melanose is very serious in Florida citrus groves, causing a large percentage of low-grade fruit. Stem-end rot is due to the same fungus, and causes much decay in transit. The fungus reproduces in the dead terminal twigs and branches and in the outer dead wood. Removing dead wood is highly recommended. The disease makes its appearance on leaves, twigs and fruit as small, hard, raised, reddish-brown spots scattered over the surface. These spots are generally round with a smooth glazed surface and in severe cases they often run together. The fruit may become streaked, giving a tear-stained appearance. When heavily infested the fruits are dwarfed, the leaves drop, and the young stems are covered with a hard brown crust. On the leaves and sometimes on fruits there are circular markings which are supposed to be formed in the following manner: Many spores held in a drop of water, soon lodge on the edge through surface tension. When the water evaporates these spores are deposited in a circle so as to form the peculiar markings mentioned. The disease is caused by *Phomopsis Citri*. The fungus cannot penetrate healthy bark; it must pass through a wound or natural opening. Young and growing tissues are susceptible. Fruit

becomes immune about the last of May. Bordeaux-oil spray has been used for experimental purposes with good results. A list of spray schedules for citrus trees is presented.—*J. C. Th. Uphof.*

5820. CLAYTON, EDWARD E. The relation of temperature to the *Fusarium* wilt of the tomato. *Amer. Jour. Bot.* 10: 71-88. Pl. 8-11, fig. 1. 1923.—This is a study of the effect of air and soil temperature on the wilt disease of tomatoes caused by *Fusarium Lycopersici*. This fungus in pure culture showed a minimum temperature for growth of 9-10°C., an optimum of 28°C., and a maximum of 37°C. Tomato plants grew from 19 to 35°C., but thrived best at 24-31°C. The various symptoms are described as they appear under optimum temperature conditions, as well as somewhat above and below. Both host and parasite, taken individually, develop at wider ranges of temperature than does the disease itself. The fungus infests the vascular bundles, but death of the host is believed to be due to a toxic action of the fungus rather than to a plugging of the xylem ducts. When soil temperature alone was varied the optimum for the disease was about 28°C., while soil temperatures of 33°C. or above, or of 19°C. or below, inhibited the disease. Air temperature proved as effective in controlling the appearance of the disease as soil temperature. Only when the soil was kept warm (27°C.) and the air warm (27°C.) or hot (33°C.) did the disease develop rapidly. If the soil was kept too cool or too warm, the disease did not develop, even with optimum air temperature. In cool air and optimum soil temperature, heavy infection occurred in the root and base of the stem, but the plant continued to grow and there were no external disease symptoms. Sudden but temporary increases in air temperature seem to increase its virulence.—*E. W. Sinnott.*

5821. CURTIS, K. M. Two fungal diseases of the blue lupin. *New Zealand Jour. Agric.* 26: 240-246. 10 fig. 1923.—A disease due to *Botrytis cinerea* and one presumably caused by *Ascochyta Pisi* are found attacking blue lupin. The *Botrytis* is most common on cultivated plants while the *Ascochyta* occurs chiefly on volunteer plants.—*N. J. Giddings.*

5822. DEMAREE, J. B. Pecan scab experiments in 1922. *Amer. Nut Jour.* 18: 4. 1923.—Two applications of Bordeaux in late summer gave no immediate favorable results but delayed the appearance of the fungus the next year by preventing its hibernation on the twigs. At Baconton, Georgia, satisfactory control was obtained by spraying with 3-6-50 Bordeaux on June 13, with 4-6-50 Bordeaux on July 6, and following by 2 applications of 1-2-50 Bordeaux mixed with 1 gallon of concentrated lime sulphur on July 27 and Aug. 23. At De Witt, Georgia, the best results were obtained with 1-50 lime sulphur spray. The addition of 1 pound of dissolved CuSO_4 to each 50 gallons improved the sticking qualities. Bordeaux was more effective in controlling scab but injured the foliage. The cost of spraying was about 25 cents per application per tree. The addition of soap or casein to Bordeaux did not increase the adhering properties. Spraying was justified on plantings containing 7 or more trees.—*E. L. Overholser.*

5823. DETWILER, S. B. Cooperative white pine blister rust control. *Monthly Bull. California Dept. Agric.* 11: 636-638. 1922.—There are quarantine laws prohibiting the shipment of 5-leaf pines and currant and gooseberry plants west of a line from Minnesota to Texas. Government inspectors examine packages to prevent shipment of prohibited plants. Infections of white pine blister rust dating from 1914 or earlier have been found in British Columbia and Washington. The disease is more disastrous to the western white pine than to the eastern white pine. Complete destruction of black currants in all pine-growing states would be advisable.—*E. L. Overholser.*

5824. FAWCETT, G. L. La "gomosis" de los naranjos. [Gummosis of oranges.] *Rev. Indust. y Agric. Tucuman* 12: 149-155. 5 fig. 1922.—Two types of gummosis of citrus trees are recognized in Tucuman. The 1st attacks the trees at the soil level and below, working out along the main roots. This is the type commonly known as foot-rot and is especially

prevalent on seedlings. It is characterized by a rotting of the bark with more or less copious gum formation and is thought to be due to *Phytophthora terrestris* Sherb. Contributing factors are excessive moisture and improper cultivation. The diseased areas should be thoroughly cleaned out and the wounds treated with Bordeaux paste. As preventive measures sour orange or other resistant stocks should be used and care taken not to plant too deep.—The 2nd type is that known as "scaly bark" and appears in the upper part of the tree. Gummings may or may not be present. The cause is not known.—*John A. Stevenson.*

5825. GILCHRIST, GRACE G. **Bark canker disease of apple trees caused by *Myxosporium corticolum* Edgert.** Trans. British Mycol. Soc. 8: 230-243. Pl. 9-11, 3 diagr. 1923.—This disease is characterized by the formation of large longitudinal scars on the sides of apple-tree branches. In the dead tissues of these scars numerous acervuli are found. These scars increase rapidly only during 1 period each year. The fungus is most abundant in the cortex but occurs also in the phloem and in the first 1 or 2 annual rings of wood. Except under certain conditions the fungus seems to be a weak parasite but when these conditions are met it causes serious injury and may even result in the death of the tree.—*W. B. McDougall.*

5826. GIRARDI, I. **La sarna de las naranjas.** [Citrus scab.] Defensa Agric. [Uruguay] 3: 108. 1922.—Scab, said to be due to *Pleospora esperidearum*, is a serious disease of oranges in Uruguay. Control measures are outlined.—*John A. Stevenson.*

5827. GIROLA, CARLOS D. **Ganoderma sessili** Morrill. [sic] Bol. Ministerio Agric. Nacion [Argentina] 27: 236-239. 2 pl. 1922.—*Ganoderma sessile* Murr. has been prevalent in some parts of Argentina as a cause of root rot of *Prunus armeniaca*, *P. domestica*, *Pyrus*, *Ficus carica*, *Punica granatum*, *Robinia*, *Gourliea decorticans*, *Casuarina*, *Eucalyptus* sp., and other forest trees. Control measures are outlined.—*John A. Stevenson.*

5828. GOLDSWORTHY, MARION C. **Peach leaf curl.** Associated Grower 5¹: 6. 1923.

5829. GONZALEZ, MANRIQUE R. **El añublo o tizon del trigo, la avena y la cebada.** [The smuts of wheat, oats and barley.] Rev. Agric. [Mexico] 7: 307-313. 8 fig. 1922.—The smuts attacking wheat, oats, and barley in Mexico are discussed and control measures outlined.—*John A. Stevenson.*

5830. GRAM, E. **Om Kartoffelbrok og Foranstaltninger mod denne i vore Nabolande.** [Potato wart and control measures in adjacent states.] Ugeskrift Landm. 68: 32-33. 1923.—This is a review of the situation in Germany where *Synchytrium endobioticum* is spreading, in England where it is common in certain regions, in Holland and Norway where it is limited, and in Sweden where in 1912 it was exterminated in 2 localities.—*Ernst Gram.*

5831. HEALD, F. D., G. L. ZUNDEL, and L. W. BOYLE. **The dusting of wheat and oats for smut.** Phytopathology 13: 169-183. Fig 1. 1923.—A report of 2-years' results on dust treatment of seed wheat for the prevention of bunt (*Tilletia Tritici*) is given. The dusts used include copper carbonate, Corona Compound of copper carbonate, anhydrous copper sulphate and calcium carbonate, anhydrous copper sulphate and hydrated lime, and Sedosan. Copper carbonate has given the most satisfactory results. With heavily smutted seed sown in spring, 2 ounces of copper carbonate dust per bushel gave perfect protection in 1921. In 1922, 3 ounces per bushel were required for perfect protection. For fall-sown wheat on fallow land the results have not been so satisfactory, though the copper carbonate dust was more effective than formalin and nearly as effective as copper sulphate solution in field trials of fall-sown wheat.—*B. B. Higgins.*

5832. HERRERA, A. L. **La gomosis del naranjo.** [Gummosis of the orange.] Agric. Mexicano y Hogar 39: 57-59. 1923.—Gummosis, reported as "probably due to *Fusisporium limonii*," is a serious disease of the orange in Mexico. A gummy exudate appears at the base

of the tree and out along the larger roots. This is followed by a rotting of the bark. The disease is favored by faulty drainage and other unfavorable cultural conditions. The remedying of these conditions and the use of resistant stocks is recommended.—*John A. Stevenson.*

5833. KENOYER, L. A. [Rev. of: JACKSON, H. S., and E. B. MAINS. Aecial stage of the orange leafrust of wheat, *Puccinia triticina* Eriks. Jour. Agric. Res. 22: 151-171. Pl. 21, fig. 1. 1921 (see Bot. Absts. 11, Entry 480).] Jour. Indian Bot. 3: 118. 1922.

5834. KING, C. J. Cotton rootrot in Arizona. Jour. Agric. Res. 23: 525-527. 1923.—*Ozonium omnivorum* fruits abundantly at Sacaton, Arizona. The fungus spreads in a "fairy ring" and the fruiting bodies are found abundantly on moist soil at the margin of the ring. A felt-like mat is formed 15-25 cm. outside the outer circle of recently wilted plants.—Cotton plants were infected by placing diseased roots beside healthy ones and also by inoculation with mycelium from pure culture.—Spores are germinated with difficulty and have not been used successfully as a medium of infection.—Progress of the rings has been stopped by saturating the soil at the periphery of the ring with 1 part commercial (40 per cent) formaldehyde to 100 parts water. In alfalfa fields the zone of disinfection must be about 75 cm. outside the line of wilted plants and in cotton fields 150 cm.—*D. Reddick.*

5835. KULKARNI, G. S. Smut (*Ustilago paradoxa* Syd. and Butl.) on sawn (*Panicum frumentaceum* Roxb.) Jour. Indian Bot. 3: 10-11. 1922.—This is thought to be the 1st record of this smut from the Bombay Presidency, where it was found in 1919. Infection occurs in the seedling stage, and can be prevented by treating the seed for 10 minutes with 2 per cent copper sulphate solution.—*Winfield Dudgeon.*

5836. LEHMAN, S. G. Pod and stem blight of the soybean. Jour. Elisha Mitchell Sci. Soc. 38: 13. 1922.—The causal agent is an Ascomycete and is given the name *Phomopsis Sojæ*. It attacks pods, stems, and less often leaves; and seed in diseased pods are frequently invested by a conspicuous, white, fungus covering. Infected areas become specked with minute, black pycnidia which form spores in a few days. The plant overwinters in diseased stems and seeds.—*W. C. Coker.*

5837. McDONALD, A. H. E. Dry treatment of seed wheat for bunt. Agric. Gaz. New South Wales 34: 239-241. 1 fig. 1923.—The machine designed by the Washington Experiment Station for treating with copper carbonate is figured and discussed.—*L. R. Waldron.*

5838. MIYAKE, KOJI, und MASASHI ADACHI. Chemische Untersuchungen über die Widerstandsfähigkeit der Reisarten gegen die "Imochi-Krankheit." Erster Bericht. Vergleich der hauptsächlichsten chemischen Bestandteile von vorläufig zwei in Hokkaido angebauten Reisarten, einer empfänglichen und einer widerstandsfähigen. [Chemical studies of varietal resistance of rice to the rice blast fungus. First paper. Comparison of the chief chemical constituents of a susceptible and a resistant variety cultivated in Hokkaido.] Jour. Biochem. Tokyo 1: 223-239. 1922.—Two varieties of rice, "Akage," which is susceptible to rice blast, and "Bozu," which is resistant, were used. The plants were analyzed at 3 stages of development, (1) appearance of the spikes, (2) beginning of bloom, and (3) when the seed were in milk, analyses being made upon both expressed juice and entire plants. For the studies on expressed juice, the heads were removed and discarded, the leaves and stalks were ground and pressed, and the expressed juice centrifuged to remove starch. The susceptible Akage was lower in total solids in the 1st period and higher in the 2nd and 3rd, than Bozu. It was lower in protein in the 1st and 2nd periods, but higher in the 3rd period; higher in total nitrogen in all 3 periods; higher in protein nitrogen in the 1st and 3rd periods but lower in the 2nd period; higher in non-protein nitrogen in the 1st and 2nd, but lower in the 3rd. Reducing sugars were higher in Akage in the 1st and 3rd periods, lower in the 2nd; while non-reducing sugars were higher in all 3 periods, especially so in the 1st and 3rd. The analyses of entire plants exclusive of heads, showed that Akage was higher in total solids, nitrogen-free

extract, and non-reducing sugars; but lower in crude fiber and ash at all 3 periods of development. Protein and total nitrogenous materials were higher in Akage in the 1st and 2nd periods, and lower in the 3rd; but protein nitrogen was lower in the 1st period, and higher in the 2nd and 3rd, while non-protein nitrogen was higher in the 1st and lower in the 2nd and 3rd. Fat content was identical in the 2 varieties in the 1st and 2nd periods, but lower in Akage in the 3rd. Reducing sugars were lower in Akage in the 1st period, but practically double in the 2nd and 3rd. The distribution of organic and inorganic materials between nodes and internodes in the 3rd period was also studied, the nodes being richer in organic materials than the internodes, and the absolute amounts higher in Akage than in Bozu. Comparative studies of the leaves of the 2 varieties in the 2nd period showed rather small differences, Akage being slightly higher in nitrogenous constituents and reducing sugars, magnesia and phosphoric acid, than Bozu. Ash analyses of entire plants at all 3 periods of growth showed that Bozu is slightly higher in total ash, materially higher in silica and calcium, slightly higher in sodium and sulphur, and lower in potassium and phosphoric acid, throughout the development. The suggestion is made that the higher inorganic content of Bozu, especially in silica, may serve as a mechanical protection against infection by the fungus. [See also following entry.]—*Joseph S. Caldwell.*

5839. MIYAKE, KOJI, und MASASHI ADACHI. *Chemische Untersuchungen über die Widerstandsfähigkeit der Reisarten gegen die "Imochi-Krankheit."* Zweiter Bericht. Der Einfluss der Wasserstoffionenkonzentration auf das Wachstum des Pilzes. [Chemical studies of the varietal resistance of rice to the rice blast fungus. Second paper. The influence of H-ion concentration upon the growth of the fungus.] Jour. Biochem. Tokyo 1: 241-247. 1922.—Cultures of the "Imochi"-fungus [*Dactylaria parasitans* Cavara] were grown upon a synthetic medium composed of 1 gm. asparagin, 1 gm. NH_4NO_3 , 0.5 gm. acid potassium phosphate, 0.25 gm. MgSO_4 , and 20 gm. cane sugar in 1 l. H_2O . Four series of 100 cc. flasks of this solution were prepared and inoculated. One series of 11 flasks received 1-10 cc. $\frac{N}{100}$ HCl, while the others received like quantities of H_2SO_4 , tartaric, and citric acids of like concentration. The range of pH in the series was 6.1-2.6. The fungus made no growth in 10 days at pH 2.6-3.3, very slight at pH 3.3-4.2, fairly good at pH 4.4-5.8, and excellent growth at pH 5.9-6.1. The pH of the medium is altered by the growth of the fungus in direct proportion to the vigor of the growth; solutions which originally had a pH of 6.1 had increased in acidity to pH 5.7-4.9 at the end of 10 days. A similar but smaller shift occurs throughout the series wherever growth occurs. The authors state that in their earlier work (see preceding entry) they found very slight differences in the H-ion concentration of the juice of Akage (susceptible) and Bozu (resistant) rice, but do not present the data, promising further work on the subject.—*Joseph S. Caldwell.*

5840. PHILLIPS, EDITH H. *Checking fig smut.* Associated Grower 5²: 20-22. 1923.—Fig smut, *Aspergillus niger*, is carried by the dried fruit beetle, *Carpophilus* Linn., and the vinegar fly, *Drosophila ampelophila* Weigen. The author recommends removing, burning, or plowing under all waste fruit to destroy the breeding places of the beetle.—*E. L. Overholser.*

5841. POTTER, M. C. *Wart disease of the potato.* Preliminary experiments. Trans. British Mycol. Soc. 8: 247-249. 1923.—The experiments, briefly described, indicate that high soil alkalinity prevents the disease, due to *Synchytrium endobioticum*, but that it also has a tendency to reduce the crop. More extensive experiments on the relation of the wart disease to both alkalinity and acidity are planned for the coming year.—*W. B. McDougall.*

5842. SCOTT, C. EMLÉN. *Disease of chestnut trees new to California.* Monthly Bull. California Dept. Agric. 11: 740-741. 1922.—A disease caused by a species of *Fusicoccum* closely related to *Endothia parasitica* (Murr.) Anders., which causes the chestnut blight, has appeared in Grass Valley, California. The *Fusicoccum* sp. enters the bark through wounds forming a canker which spreads lengthwise and around the branch and finally girdles it,

killing all parts beyond the canker. The disease is probably less virulent than that caused by *Endothia parasitica*. The recommendations for control are to remove all affected parts and thoroughly disinfect pruning wounds.—*E. L. Overholser*.

5843. SHARPLES, A. Final report on treatment of mouldy rot disease with Agrisol. Malayan Agric. Jour. 11: 36-37. 1923.—The treatment earlier reported (see Bot. Absts. 12, Entry 1262) has been continued satisfactorily for a further period of 18 months. In the writer's opinion complete eradication is impossible owing to the periodic production of resting spores of *Sphaeronema fimbriatum*, but effective control at small cost is possible.—*R. E. Holttum*.

5844. SMITH, E. H., AND E. H. PHILLIPS. Studies of the so-called "smut" of white fig varieties. Monthly Bull. California Dept. Agric. 11: 755-758. Fig. 178-180. 1922.—Smut, caused by *Aspergillus niger* (*Sterigmatocystis*), occurs on all white figs, but especially on Adriatics. Natural infections occur in ripe figs ready to pick for fresh shipment, although artificial inoculations are successful even in hard green fruit. Ants, fruitflies, and beetles are the chief spore carriers.—*E. L. Overholser*.

5845. SNELL, WALTER H. The effect of heat upon wood destroying fungi in mills. Proc. Amer. Wood Preservers' Assoc. 18: 25-32. 1922.—This paper is a preliminary report of experiments to determine the thermal death points of the mycelia of 5 mill fungi within wood, using both moist and dry heat. The five fungi were: *Lenzites sepiaria*, *L. trabea*, *Trametes serialis*, *T. carnea*, and *Lentinus lepideus*. None of the fungi could withstand 131°F. for 12 hours, while it took 221°F. for 12 hours to kill all the fungi with dry heat. At 212°F. 1 fungus survived 12 hours and another 24 hours in dry heat. It is concluded that the use of heat in buildings for killing these fungi is of no use, although it is recommended as a deterrent or preliminary preventive. It is pointed out from the curves that kiln drying, as well as the heat developed in certain wood-preservation processes, should kill all of these fungi.—*Walter H. Snell*.

5846. SPIECKERMANN, A. Wie kann die weitere Verbreitung des Kartoffelkrebses in Deutschland verhindert werden? [How can the further spread of the potato wart disease in Germany be prevented?] Illus. Landw. Zeitg. 42: 371-372. 1922.—It is recommended that resistant varieties, clean seed, and quarantine methods be employed to prevent the spread of the potato wart disease caused by *Chrysophlyctis endobiotica*.—*John W. Roberts*.

5847. STANFORD, H. R. Control of peach scab. Monthly Bull. California Dept. Agric. 11: 765-774. Fig. 181-185. 1922.—Peach scab, caused by *Cladosporium carpophilum* Thüm., has been increasing in severity in California. The Lovell variety is most affected; Ontario, Elberta, Muir, and Phillips Cling have been damaged somewhat. Scab caused at least 15 per cent of the peaches in a sample of Lovells to go into inferior grades. If the fruit is canned rather green, many smaller scab spots come off in the lye solution.—The author gives the life history of the fungus.—Two sprays of self-boiled lime-sulphur applied during the period from 1 month after blooming to 6 weeks before ripening gave satisfactory results.—*E. L. Overholser*.

5848. TISDALE, W. H., J. W. TAYLOR, AND MARION A. GRIFFITHS. Experiments with hot water, formaldehyde, copper carbonate, and chlorophol for the control of barley smuts. Phytopathology 13: 153-160. 1923.—Experiments on the control of loose smut (*Ustilago nuda* (Jens.) Kell. and Schw.) and covered smut (*U. Hordei* (Pers.) Kell. and Schw.) of barley were conducted through a period of 3 years. Various seed disinfectants were tried, but special attention was given the modified hot-water treatment and the formaldehyde treatment. Both treatments were effective in reducing the amount of infection by either fungus. Formaldehyde was more effective in the control of loose smut than in the control of covered smut, was only slightly less effective than the modified hot-water treatment, and was much more

easily applied. Both treatments injured germination to some extent; and little or no increase in yield resulted from the treatments. There was considerable variation in the reaction of the different varieties to the treatments used.—*B. B. Higgins.*

5849. WEIR, JAMES R. The genus *Polystictus* and decay of living trees. *Phytopathology* 13: 184–186. 1923.—Several collections of species of *Polystictus* growing on wood of living forest trees are reported. In every case the fungi were growing on injured portions of the tree, and in most cases no extensive decay was produced. The opinion is expressed that fungi of this genus may generally be ignored in forest management.—*B. B. Higgins.*

DISEASES CAUSED BY BACTERIA

5850. ANONYMOUS. Instrucciones para extirpar la gomosis de la caña de azúcar. [Instructions for eradicating gummosis of sugar cane.] *Rev. Agric. Puerto Rico* 6: 23. 1921.—The author recommends the use of disease-free seed of resistant varieties and the destruction of diseased stools.—*John A. Stevenson.*

5851. LEVIN, ISAAC, AND MICHAEL LEVINE. The action of buried tubes of radium emanation on neoplasias in plants. *Jour. Cancer Res.* 7: 163–170. 1 pl. 1922.—In normal adult plant tissue the only perceptible result of the insertion of a radium-emanation tube is a complete destruction of tissue in the immediate vicinity. A similar insertion into crown-gall tissue is followed by inhibition of development of the neoplasia, thus indicating an inhibition of the nuclear proliferating activity. The cellulose cushion seems to play a role in plants in walling off the necrotic area about the radium-emanation tubes and in filtering off the soft beta rays similar to the role played by connective tissue stroma in animal tumors.—*Frederick V. Rand.*

5852. LEVIN, ISAAC, AND MICHAEL LEVINE. The rôle of neoplasia in parasitic diseases of plants. *Jour. Cancer Res.* 7: 171–178. 1 pl. 1922.—Neoplasia in parasitic diseases of plants is, according to the authors, unlike neoplasia in animal cancer since it always represents a protective reaction of the plant organism against the invasion of a parasite. Plant neoplasias behave more like reactive neoplasia in an animal than like animal cancer. Neoplastic tissue in plants is constructed of only 1 type of cells and presents therefore an ideal material for the study of tumor formation. The study of plant neoplasias should become an integral part of all phases of cancer research, whether aiming at the elucidation of the etiology or pathogenesis of the disease or of the correct basis for therapy.—*Frederick V. Rand.*

5853. MATZ, JULIUS. La enfermedad de la gomosis de la caña de azúcar. [Gummosis of sugar cane.] *Rev. Agric. Puerto Rico* 9: 11–14. 2 fig. 1922.—The history of the gumming disease (*Bacterium vascularum* (Cobb) G. Smith) in Porto Rico is reviewed with brief mention of symptoms and control measures. Among resistant varieties are D109, D433, D625, D117, Uba, B208, Yellow Caledonia, B3412, B6292, B1809, P.R. 333, P.R. 334, and P.R. 292.—*John A. Stevenson.*

5854. MATZ, JULIUS. Observaciones en la gomosis de la caña en Puerto Rico. [Observations on gummosis of cane in Porto Rico.] *Rev. Agric. Puerto Rico* 6: 33–39. 2 fig. 1921.—The gummosis (*Bacterium vascularum*) of sugar cane was first discovered in Porto Rico in Feb., 1920, at which time field inspections indicated that the disease was limited to a comparatively small area around Rio Piedras on the North coast. Within a year it had spread over a much wider area. In addition to the usual symptom reported, namely, the exudation of a gummy substance when infected canes are cut, others have been noted. Characteristic markings appear on the leaves, either as gray stripes or short linear spots. There is a tendency toward incomplete unfolding of the center leaves. Infected plants are stunted and commonly develop top rot. The vascular bundles are stained red.—Diseased stools should be dug and only disease-free seed used in replanting. The native white variety (Otahiti) is

very susceptible to the disease, Cristalina and Rayada are more resistant, while Yellow Caledonia and D109 are very resistant. Planting tests with a number of varieties seem to indicate that the disease is not transmitted through the soil.—*John A. Stevenson.*

5855. MATZ, JULIUS. Observaciones sobre la gomosis de la caña en Puerto Rico. [Observations on the gummosis of sugar cane in Porto Rico.] Rev. Agric. Puerto Rico 84: 5-14. 2 fig. 1922.—Within a year after its discovery [see preceding entry], gumming disease (*Bacterium vascularum*) of sugar cane had spread at least 25 km. During 1922 the disease spread over much of the Island. Symptoms are again given [see preceding entry]. Several varieties of cane grew normally in soil from which diseased plants had been removed. Cane varieties varied greatly in resistance: White or Otahiti, Rayada, Cristalina, B376, P.R. 358, and P.R. 491 proved very susceptible; Kavangire, Yellow Caledonia, and a number of Porto Rican seedlings were very resistant, if not immune; other varieties showed greatly varying degrees of resistance between these 2 groups. The importance of using disease-free seed for planting is emphasized.—*John A. Stevenson.*

5856. MILBRATH, D. G. Résumé of pear blight history and methods of control. Monthly Bull. California Dept. Agric. 11: 760-765. 1922.—Pear blight, *Bacillus amylovorus* (Burr.) Trev., occurred in all states where apples and pears were grown in 1922, and was serious in California, Vermont, New Jersey, Michigan, Montana, and Arizona. Descriptions of the symptoms and method of infection are given. Use of resistant or immune root-stocks and trunks, and cutting out of blight cankers are the chief methods of control. Cutting starts in the fall, and should be carefully done. All tools should be disinfected. The solution recommended is mercuric cyanide and bichloride of mercury, 1 ounce of each in 4 gallons of water.—*E. L. Overholser.*

5857. SMITH, ERWIN F. Appositional growth in crown-gall tumors and in cancers. Jour. Cancer Res. 7: 1-105. 28 pl. 1922.—The views of various medical investigators relative to appositional growth in cancers are reviewed, and the following data relative to crown gall are presented by the author: (1) The absence of any capsule, and the conversion of cortex-cells into tumor-tissue by contact (growth by apposition), something easily to be understood in this tumor because it is due to an intracellular schizomycete, and the adjacent cellulose walls of the cortex-cells, ray-cells, and pith-cells are numerous pitted and are fundamentally all 1 type of tissue; (2) the frequent limitation of the appositional growth through the crushing of remoter cells of the cortex; (3) the limitation of peripheral growth on one side or lobe of a tumor for no apparent reason while it continues on the other side or lobes; (4) the penetration of the tumor by way of the medullary ray across the phloem, cambium and the woody cylinders, which are split apart; (5) the formation in some cases of independent small tumors (pseudometastases) in the pith near the primary tumor although the inoculations were restricted to the cortex; (6) the downward invasion of a medullary ray (beginning of a tumor-strand) in the wood; (7) the small size and immaturity of the tumor-cells in comparison with the size and age of the mother-cells and their great affinity for tumor-stains; (8) the enormous multiplication of cells considering that the tumors were produced by single infected needle-pricks and that the whole period of growth was only 3 weeks; (9) the absence of any intercellular spaces in the tumor tissue or in the rapidly dividing transition tissue; (10) the distinct enlargement of the cortex-cells before their conversion into tumor-cells, which leads to a thickening of the cortex around the tumor, a sort of cushion being formed of which the tumor is the center; (11) the tendency of the nuclei in the transition tissue to be large and to be variously notched, cleft, lobed, or mulberry-shaped and the occasional occurrence of 2-4 nuclei in the cell; (12) the big border around the nucleoli, perhaps only an indication of rapid growth; (13) numerous faint-staining abnormal granules in the cytoplasm of the transition tissue and of the tumor tissue as seen under high powers; (14) the fact that in young plants (those less than half grown) almost any cortex-cell is capable of further and repeated division, especially under a tumor-stimulus, whereas results on old tissues tend to confirm Bard's view that the reproductive capacity of old cells is zero; (15) development of roots under and near

the tumors as a result of the tumor stimulus; (16) experimental disproof of Ribbert's dictum that parasites cannot change the form of cells or cause them to proliferate. Schmieden's words respecting his studies of liver tumors describe the hypertrophy on the margin of these crown galls exactly: "aus diesen Riesenzellen wächst unmittelbar eine Brut hervor, die keine Leber [Cortex]-zellen mehr sind, sondern Zellen des Tumors."—*Frederick V. Rand.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

5858. BALLARD, E. *Platyedra gossypiella* Saund., the pink boll-worm in South India, 1920-1921. Mem. Dept. Agric. India Entomol. Ser. 7: 171-193. Pl. 16-18. 1923.—Since 1 boll-worm (*Platyedra*) eats only 2 or 3 seed the damage might be assumed to affect only 1 locule, but in addition to this the lint is often stained, fungus spores enter through the escape-hole of the larva, and threads of lint are often stuck together. Unattacked seed in an attacked boll are also affected.—Larvae of *Earias* spp. wander from boll to boll, destroy buds and young bolls, and by the holes which they make in grown bolls provide an entrance for fungi and bacteria.—Details of actual losses from these insects are given.—*Frederick V. Rand.*

5859. CORBETT, G. H. Preliminary note on the two coloured coconut leaf beetle (*Plesispa Reichel* Chap.). Malayan Agric. Jour. 11: 64-69. 1923.—This insect was formerly little known but is now generally distributed throughout Malaya. It attacks many palms, eating the young leaves before they unfold. Both larval and adult stages feed upon the upper and lower surfaces of coconut palm leaves, eating in straight lines without interruption. Later these lines unite with each other so that the remaining tissue dries and rots, the leaf tears, and the young plants take on a peculiar weather-beaten appearance and their growth is seriously retarded. It is especially a pest of seedlings and young plants but usually causes little permanent injury to older plants. It can be effectively dealt with by means of a solution of lead arsenate.—*R. E. Holthum.*

5860. CORY, ERNEST N. Experiments on the control of the woolly aphis. Maryland Agric. Exp. Sta. Bull. 252. 25-36. 1923.—Two applications per year of an 8 per cent solution of pine-tar oils seem to offer the best promise for control, with a minimum of injury to the apple trees. Injury is likely to result from 15-20 per cent solutions, and repetition of the 2 applications at the 8 per cent strength for 3 seasons caused considerable injury.—*Frederick V. Rand.*

5861. KINSEY, ALFRED C. Studies of some new and described Cynipidae (Hymenoptera). Indiana Univ. Studies 9: 1-141. 1922.—This paper gives descriptions of a large number of gall wasps and the galls which they incite, and offers some data on the variation, distribution, life histories and phylogeny of these insects.—*Frederick V. Rand.*

5862. KINSEY, ALFRED C., and KENNETH D. AYRES. Varieties of a rose gall wasp (*Cynipidae*, Hymenoptera). Indiana Univ. Studies 9: 142-162. 1922.—This is a study of the varieties of *Diplolepis tuberculatrix* Cockerell and includes descriptions both of the insects and the plant galls induced by them.—*Frederick V. Rand.*

5863. MCWHORTER, FRANK P. The nature of the organism found in the Fiji galls of sugar cane. Louisiana Planter 70: 148-150. Fig. 1-2. 1923.—Reproduced from The Philippine Agriculturist [see Bot. Absts. 12, Entry 2644].—*C. W. Edgerton.*

5864. NÜSSLIN, OTTO. Forstinsektenkunde. [Forest insects.] 3rd ed., edited by L. RHUMBLER. xvi + 568 p., 457 fig. Paul Parey: Berlin, 1922.—The 1st part of the work is a general treatise dealing with the morphology, biology, and physiology of insects. In addition, insects injurious and beneficial to forests are briefly discussed.—In the 2nd part insects are treated in systematic order, detailed descriptions being given as well as host reactions.—*Lillian C. Cash.*

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOW GROUPS, ETC.)

5865. ANONYMOUS. Virus diseases of plants. *Nature* 111: 551. 1923.—This is a brief popular review of the virus disease situation with special reference to a review by E. J. BUTLER in *Science Progress* for Jan., 1923.—O. A. Stevens.

5866. CHARDÓN, CARLOS E. Resumen de la literatura sobre el origen de las enfermedades del "mosaico" en las plantas. [Résumé of the literature on mosaic diseases of plants.] *Rev. Agric. Puerto Rico* 9⁴: 13-22. 1922.—The literature dealing with mosaic diseases of tobacco, sugar cane, and other crops is reviewed and the various theories as to the causative agents, such as bacterial, physiological, filterable virus, etc., are discussed. A bibliography is appended.—John A. Stevenson.

5867. CHARDÓN, CARLOS E., y RAFAEL A. VEVE. Sobre la transmisión del matizado de la caña por medio de insectos. [Transmission of cane mosaic by insects.] *Rev. Agric. Puerto Rico* 9²: 9-20. 2 fig. 1922.—A number of workers in Porto Rico and Cuba have investigated the possibility of insects acting as carriers of the mosaic disease of sugar cane, but for the most part with negative results. Brandes, working in Washington, demonstrated that *Aphis maydis* can transmit the disease from diseased to healthy cane. Observations of the authors demonstrated that this insect is of common occurrence on malojillo (*Panicum barbinode*) and other grasses growing as weeds in cane fields and that when the weeds are cut the insects pass over to the cane for a short time, with the result that mosaic appears on previously healthy plants in about 3 weeks. This period of incubation corresponds with that established by Brandes. In order to check up the field observations, large insect-proof cages were placed over stools of the cane variety D1111 and weed grasses allowed to grow. A supply of *Aphis maydis* was placed in one cage and another left as a check. Mosaic appeared on 64 per cent of the cane plants following the cutting of the grass. Plants in the check cage remained free from disease. Similar experiments with a new species of leaf hopper (*Carolinia*) which lives on *Cyperus rotundus* likewise gave positive results.—John A. Stevenson.

5868. CHARDÓN, C. E., and R. A. VEVE. The transmission of cane mosaic. *Facts about Sugar* 15: 281, 283-284. 1922.—[See preceding entry.]

5869. CHARDÓN, CARLOS E., and R. A. VEVE. Transmission of cane mottling disease through insects. *Louisiana Planter* 69: 323-325. Fig. 1-2. 1922.—Translated from *Rev. Agric. Puerto Rico* [see 2nd preceding entry].

5870. COLEMAN, LESLIE C. Transmission of sandal spike. *Indian Forest*. 49: 6-9. Pl. 1-3. 1923.—A number of sandal seedlings (*Santalum album*) were planted in small groups, and after 5-years' development of the trees, spike was introduced into the group by grafting a diseased branch to one member of the group. In 2 months the disease had been communicated to the other trees in the group and upon removing the soil haustorial unions were discovered. In 2 cases the haustoria belonged to the originally healthy tree and were attached to the infected tree by natural grafting. Apparently the infective virus or organism was transmitted freely through the roots.—E. N. Munns.

5871. COLON, E. D. Trabajos de investigación durante el año fiscal de 1919-20. [Investigational work during the fiscal year 1919-20.] *Rev. Agric. Puerto Rico* 6³: 7-14. 1921.—The mosaic disease of sugar cane was attacked from various angles, all divisions of the experiment station giving it attention. Experiments in the transmission of the disease were carried out by the entomologist, varietal resistance tests by the agronomist, and etiology studies by the pathologist. The latter work is said to have demonstrated the presence of certain bodies in the cells of diseased plants which may be those of a causative organism. Other cane diseases, including root disease, were also studied.—John A. Stevenson.

5872. GRAM, ERNST. Kan vi kontrollere os fra Bladrullesygen? [Can potato leaf-roll be controlled by inspection?] Vort Landbrug [Copenhagen] 41: 416-417. 1922.—With the heavy attacks of leaf-roll and mosaic in Denmark during 1922 in mind it is urged to utilize localities which act as "sanatoria," together with the Dutch methods of rigid inspection and control of the progeny.—*Ernst Gram*.

5873. LUGO, F. OLIVER. El mosaico del tabaco y como combatirlo. [Tobacco mosaic and its control.] Rev. Agric. Puerto Rico 10¹: 11-14. 1923.—The author believes that the infectious principle of mosaic disease of tobacco persists in the soil from one season to another and therefore recommends a 3-year rotation in addition to the destruction of diseased plants. Such a rotation would include tobacco, a leguminous green manure crop, and a food crop such as corn, yautía, or sweet potatoes.—*John A. Stevenson*.

5874. MATZ, JULIUS. Recientes investigaciones en el estudio de la naturaleza del mosaico de la caña de azúcar y otras plantas. [Recent investigations into the nature of mosaic of sugar cane and other plants.] Rev. Agric. Puerto Rico 9⁴: 9-12. 1922.—The mosaic diseases have been studied for many years in an attempt to ascertain the cause, but not until recently has definite progress been made. Workers with tobacco and sugar cane mosaic in Java and Hawaii, and the author in Porto Rico, have demonstrated the presence of plasmodium-like bodies in the cells of diseased plants. The exact nature of these bodies is as yet unknown. Those found in diseased sugar cane plants are considered by the author co-generic with *Strongyloplasma Iwanowskii* Palm, the name assigned to the bodies found by Palm associated with the mosaic disease of tobacco.—*John A. Stevenson*.

NON-PARASITIC DISEASES

5875. BARTHOLOMEW, E. T., J. T. BARRETT, and H. S. FAWCETT. Internal decline of lemons I. Distribution and characteristics. Amer. Jour. Bot. 10: 67-70. Pl. 7. 1923.—The term "internal decline" is applied to a physiological abnormality causing the destruction of internal tissues in the lemon fruit, usually in the styler end. It may appear almost anywhere throughout southern California, except among groves situated a few miles from the coast. All varieties may be affected. It usually begins in June, continues until November or December, and is found on trees of all ages. The various external and internal symptoms of internal decline are described as they affect fruits at the different degrees of maturity,— "dark green," "light green," "silver," and "tree-ripe."—*E. W. Sinnott*.

DISEASES OF UNKNOWN CAUSE

5876. SHARPLES, A., and L. LAMBOURNE. Preliminary report on brown bast experiments in Malaya. Malayan Agric. Jour. 11: 30-35. 1923.—Results of experiments on 410 rubber [*Hevea*] trees (divided into plots of about 50 each) subjected to 3-months' preliminary heavy tapping are recorded. As regards periods of development of Brown Bast and of quiescence no definite correlation with external conditions has been observed. In 40 out of 133 trees which developed Brown Bast there was no downward extension of the affection after tapping had ceased; in the other trees it extended downward, stopping either at the limit of virgin bark, at the junction between renewed bark of 2 and 4-6 years' growth, or at the base of the tree. In 1 plot which showed an abnormally long quiescent period the final sudden increase of Brown Bast was correlated with a sudden increase in average tree yield. The conclusion is drawn that Brown Bast is closely associated with the question of high yields and that it almost certainly acts as a limiting factor in the question of high-yielding trees. Brown Bast affection is to be considered as an exhaustion process, and if excessive yielding results in exhaustion high yielders will tend to show this effect sooner than average yielders. The question is thus of primary importance in consideration of possible results of bud-grafting practiced to obtain higher yields. The authors further point out the possibility that high-yielding bud-grafts may show accelerated vital activities and as a result may be susceptible

to diseases not affecting normal trees. The margin of safety is small and too optimistic views have been taken as to the possibilities of bud-grafting.—The phenomenon of phloem necrosis may occur independently of the production of Brown Bast.—*R. E. Holtum.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE.

5877. ANONYMOUS. Pathology of market produce. *Nature* 111: 516. 1923.—In the U. S. A. a new field of scientific investigation has been opened up between crop and consumer. This new field of market pathology is typified in recent studies by Link and Gardner, and by N. E. Stevens.—*Frederick V. Rand.*

5878. ANONYMOUS. Structure and origin of the plant gall. [Rev. of: COOK, MELVILLE T. The origin and structure of plant galls. *Science* 57: 6-14. 1923 (see Bot. Absts. 12, Entry 3452).] *Nature* 111: 483. 1923.—“Prof. Melville T. Cook has rendered a service to workers in a field where the literature is very widely scattered.”—*Frederick V. Rand.*

5879. ANONYMOUS. [Rev. of: PALMER, RAY, and W. PERCIVAL WESTELL. *Pests of the garden and orchard, farm and forest.* 413 p., 47 pl. (3 col.) Henry J. Drane: London, 1922.] *Nature* 111: 530-531. 1923.—“The authors have aimed at meeting the needs of practical agriculturists and horticulturists by collecting into one book all the available information on plant pests and diseases necessary for their guidance.”—*Frederick V. Rand.*

5880. ALLEN, W. J., and W. LE GAY BRERETON. Further experiments with a spray gun. *Agric. Gaz. New South Wales* 34: 354-356. 1923.—Using a varying pressure of 250-290 pounds with an orifice of 0.114 inches the spray gun used 4.9 gallons of spray per tree, whereas 3.8 gallons per tree were used with double nozzles and 2 leads of hose. The latter method requires less spray per tree but takes more time. Decreasing the orifice in the spray gun decreased the amount of spray used. With a coarse jet a height of 36 feet was attained. The spray gun is considered a valuable addition to spray appliances but further tests are necessary in order to measure the value of the device.—*L. R. Waldron.*

5881. ANDERSON, P. J., and A. V. OSMUN. An improved formaldehyde tank for the onion drill. *Phytopathology* 13: 161-168. *Fig. 1-3.* 1923.—It was found that the tanks usually recommended and used on onion seed drills would not deliver the liquid at a constant rate, the rate varying with the amount of liquid in the tank and with the speed of the drill. An attachment has been devised, and is here described, which eliminates the variation due to the weight of the liquid. The rate of delivery of the solution varies only with the speed of the drill.—*B. B. Higgins.*

5882. BRIERLEY, WILLIAM B. [DISCUSSION OF: LANG, WM. H. Some aspects of vegetable pathology in relation to human disease.] *British Med. Jour.* 1922. 962-963. 1922.—There is an unbridgeable gulf between the morphology, anatomy, and physiology of animals and plants. There is, therefore, little that can be helpful and much possibility of confusion in making detailed comparisons of host tissue responses in plant and animal diseases. There is, however, a vast field for common study of the great groups of microorganisms; and the utmost of value can be obtained from an intimate exchange of facts and points of view.—*Frederick V. Rand.*

5883. BUTLER, E. J. Diseases of plants in England in 1920-21. [Rev. of: COTTON, A. D. Report on the occurrence of fungous, bacterial and allied diseases on crops in England and Wales for the years 1920-21. Ministry Agric. and Fisheries Misc. Publ. 38. 104 p. 1922. (see Bot. Absts. 12, Entry 5886).] *Nature* 111: 416-417. 1923.

5884. CALL, A. H. Vacuum fumigation of nursery stock in Ventura County. *Monthly Bull. California Dept. Agric.* 11: 467-468. 1922.

5885. COMPERE, GEO. Origin of fumigation with hydrocyanic-acid gas in California. Monthly Bull. California Dept. Agric. 11: 438-442. Fig. 161-162. 1922.—The author gives a brief history of the discovery and introduction of hydrocyanic-acid gas as a means of fumigating citrus trees in California.—*E. L. Overholser*.

5886. COTTON, A. D. Report on the occurrence of fungous, bacterial and allied diseases on crops in England and Wales for the years 1920-1921. Ministry Agric. and Fisheries Misc. Publ. 38. 104 p. 1922.—This report comprises data as to prevalence, distribution, varietal reactions, etc., relative to diseases of cereals, potatoes, root crops, legumes, forage crops, vegetables, fruit, and miscellaneous crops. Weather charts and a special index to diseases are added. [See also Bot. Absts. 12, Entry 5883.]—*Frederick V. Rand*.

5887. ESCOBAR, RÓMULO. Enfermedades criptogámicas de la alfalfa. [Cryptogamic diseases of alfalfa.] Agric. Mexicano y Hogar 38: 254-258. 1922.—This is a popular account of the diseases of alfalfa found in Mexico and those that might be introduced there.—*John A. Stevenson*.

5888. FERDINANDSEN, C. Det plantepatologiske Arbejde i Danmark. [Phytopathological work in Denmark.] Nordisk Jordbrugsforskning 1922: 333-351. 2 fig. 1922.—Two lectures at the agricultural college in Berlin are printed. A German abstract appears in Der Deutsche Pflanzenschutzdienst 2: 60-62. 1922.—*Ernst Gram*.

5889. GRAM, E. Iagttagelser fra Holland. [Observations from Holland.] Ugeskr. Landmaend 67: 427-429. 1922.—This is a report on Dutch work with plant diseases, particularly those of potatoes.—*Ernst Gram*.

5890. HAUPT, L. O. Spring spraying of peaches. Associated Grower 5²: 5, 18. 1 fig. 1923.—The author briefly describes the control of peach blight, peach leaf curl, peach twig borer, San Jose scale, black peach aphid, and red spider under California conditions.—*E. L. Overholser*.

5891. LOPÉZ, BERNARDO. Algunas enfermedades del tomate en Puerto Rico. [Some Porto Rican tomato diseases.] Rev. Agric. Puerto Rico 9^o: 33-37. 2 fig. 1922.—The author discusses the diseases due to *Cladosporium fulvum* Cke., *Fusarium Lycopersici* Sacc., and *Bacillus Solanacearum* E. F. Sm. which make tomato culture difficult in Porto Rico.—*John A. Stevenson*.

5892. LUCIANO, JOSÉ. El servicio de inspección y cuarentena de plantas y la introducción de plantas a Puerto Rico. [The quarantine and inspection service of Porto Rico and the introduction of plants.] Rev. Agric. Puerto Rico 9^o: 37-41. 1922.—The entry of living plant material into Porto Rico is regulated by Insular quarantine law No. 17 and the various Federal quarantines, more particularly No. 37. These quarantines are administered by the Insular quarantine service in order to prevent further introductions of insect pests and plant diseases from which the Island is now suffering so severely.—*John A. Stevenson*.

5893. MCRAE, W. Report of the Imperial Mycologist. Sci. Rept. Agric. Res. Inst. Pusa, 1921-22: 44-50. 1922.—*Piricularia Oryzae* Br. et Cav., a destructive disease on *Oryza sativa*, has been found in several localities in India. Similar forms of *Piricularia* are destructive to *Eleusine coracana* and a number of other grasses. Some cross inoculation is possible, but it has not yet been determined whether there are 4 distinct species, or only 4 physiological strains of 1 species. A disease of rice caused by an unidentified sclerotial fungus, and another disease caused by *Cephalosporium* (?) sp. are under investigation.—*Tolyposporium Penicillariae* Bref. on *Pennisetum typhoideum*; downy mildew of maize; *Fusarium*, *Diplodia*, and *Acrothecium* diseases of *Pennisetum typhoideum* and *Zea mays*; *Helminthosporium* spp. on cereals; *Urocystis coralloides* Rostrup on mustard; smut resistance in sugarcane; and *Macro-*

phoma Corchori Saw. on jute have been studied.—Demonstrations of methods of spraying fruit trees continue.—A fungus and host index of the mycological herbarium at Pusa has been completed.—A program of work for 1922-23 and a list of papers published during the year are included.—*Winfield Dudgeon*.

5894. MATZ, JULIUS. Informe de la estacion experimental insular. Informe de la división de botánica y patología. Diciembre, 1921. [Report of the division of botany and pathology.] Rev. Agric. Puerto Rico 82: 63-65. 1922.—This is a report of continued investigation of the gumming disease (*Bacterium vascularum*), Plasmodiophora disease, and mosaic of sugar cane as well as of minor diseases of other economic crops.—*John A. Stevenson*.

5895. MILBRATH, D. G. Control of diseases of cucumbers in greenhouses. Monthly Bull. California Dept. Agric. 11: 430-437. Fig. 157-160. 1922.—The author discusses the common diseases of cucumbers in greenhouses giving their importance, symptoms, methods of infection, and measures for control.—*E. L. Overholser*.

5896. NEWELL, WILMON. The quarantine situation—what is needed. Florida State Plant Bd. Quart. Bull. 7: 149-159. 1923.—Opportunities for pests to enter are still numerous and only some of the avenues of entrance have been closed. Dangerous plant material arrives daily at every port of the U. S. A., whether or not quarantine inspectors are stationed at these ports. The Federal Horticultural Board is not affording adequate protection. Out of 35 of the more important maritime and border ports (exclusive of the Canadian line) federal quarantine inspectors are stationed at only 15 and Federal Horticultural Board collaborators (state inspectors) at 10. As to the bulb situation there are indications of a letting up in the policy of increasing protection against foreign pests.—*J. C. Th. Uphof*.

5897. NORTH, D. S. The control of sugar cane diseases. III. Australian Sugar Jour. 15: 73-83. 1923.—An estimate of 9 per cent crop loss at Broadwater has been made. Details for controlling the disease are given. Mosaic and Fiji diseases are being eliminated, but the control of gumming and leaf-scald is proving difficult.—*C. Rumbold*.

5898. SHAW, F. J. F. Report of the Imperial mycologist. Sci. Rept. Agric. Res. Inst. Pusa 1920-21: 34-40. 1921.—*Helminthosporium* diseases of cereals, especially on *Zea mays* and *Pennisetum typhoideum*; *Acrothecium lunatum* Wakker on grasses; smut on *Paspalum scrobiculatum* L.; *Piricularia* on rice [*Oryza sativa*]; diseases of chilli, jute, and areca and palmyra palms have been studied during the year. A host and fungus index of the mycological herbarium at Pusa is projected. Destruction of *Eichornia Crassipes* Solm. (water hyacinth) by spraying with a secret proprietary mixture has been found practicable. A program of work for 1921-22 and a list of publications for the year are given.—*Winfield Dudgeon*.

5899. STRONG, LEE A. The Bureau of Plant Quarantine. Monthly Bull. California Dept. Agric. 11: 852-871. Fig. 207-214. 1922.

5900. WEBER, ANNA. Tomatsygdomme. [Tomato diseases.] Aarbog for Gartneri 1922: 81-150. 10 fig. N. C. Roms Forlag: Copenhagen, 1923.—This is a prize essay from the Danish Gardeners Association containing a key, an account of each disease based on literature studies and original observations, with remarks on control, a summary of general sanitary and control work, and a bibliography and index.—*Ernst Gram*.

5901. WELDON, GEO. P. Spraying deciduous fruit trees. Monthly Bull. California Dept. Agric. 117: 24-29. 1922.—The author discusses the value of spraying, pointing out that it is an unnecessary operation unless there is a pest actually on the trees. He emphasizes the necessity of knowing the different sprays and fungicides to accomplish successful results, and discusses the pests commonly attacking different deciduous fruit trees in California with control measures for each.—*E. L. Overholser*.

5902. WELDON, GEO. P. Spring spraying of peaches with lime sulfur. Monthly Bull. California Dept. Agric. 12: 44-47. 1923.—Spring spraying with lime-sulphur controls twig borer (*Anarsia lineatella* Zeller) and peach leaf curl (*Exoascus deformans* (Berk.) Fekl). Brown mite (*Bryobia pratensis* Garman), San Jose scale (*Aspidiotus perniciosus* Comstock), and peach blight (*Coryneum Beijerinckii* Oudoom.), are also partially or wholly controlled by the same spray. Dry lime-sulphur is as effective as liquid lime-sulphur. Early spring applications give as satisfactory results as late spring applications.—*E. L. Overholser*.

5903. WENIGER, WANDA. Diseases of grain and forage crops in North Dakota. North Dakota Agric. Exp. Sta. Bull. 166. 93 p., 32 fig. 1923.—Information on the occurrence, economic importance, identification, and control of the diseases of cereal and forage crops of the state is brought together. Part I deals with diseases of cereal crops; part II with forage crop diseases; and part III with methods of disease control. Diseases of wheat, oats, barley, rye, flax, corn, proso, and sorghum are described in the order of their importance under their respective hosts. Forage crop diseases are discussed for alfalfa, red and alsike clovers, sweet clover, brome grass, millet, timothy, Sudan grass, the wild grasses of the state, and sunflower. The discussion of specific diseases includes symptoms, cause, importance, and methods of prevention. Methods of seed treatment are given and the problem of disease resistant varieties is discussed. A bibliography of the more important sources of information on specific diseases is included in foot notes.—*Wanda Weniger*.

5904. YOUNG, W. J. Waterglass. A new wound dressing for trees. Monthly Bull. Ohio Agric. Exp. Sta. 8: 13-16. Fig. 7. 1923.—The article comprises a brief discussion of the need for a wound dressing for trees and gives a brief report of the use of a solution of sodium silicate as a wound treatment. This preparation has been found very satisfactory in preventing infection from wood-rooting fungi.—*R. C. Thomas*.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 5342, 5415, 5649, 5673, 5674, 5943, 6005)

5905. ANONYMOUS. [Rev. of: GREENISH, H. G. The microscopical examination of foods and drugs. 3d. ed., xx + 386 p. J. and A. Churchill: London, 1923 (see Bot. Absts. 12, Entry 4446).] Nature 111: 459. 1923.—Additional matter has not been included in this edition on account of the high cost of printing.—*O. A. Stevens*.

5906. ASTON, B. C. The poisonous, suspected, and medicinal plants of New Zealand. New Zealand Jour. Agric. 26: 230-232. 1923.—Ferns have in some cases been reported as poisonous to stock. Poisoning is likely to occur in stock just turned into pasture containing much fern. Symptoms are described, and it is recommended that any stock showing illness be at once transferred to other pastures.—*N. J. Giddings*.

5907. BOSMAN, LOUIS PIERRE. Castelamarin- a bitter principle from *Castela Nicholsoni*. Jour. Chem. Soc. [London] 123: 207-210. 1923.—An investigation of the chemical constitution and properties of castelamarin showed only slight pharmacological activity. However, at a dilution of 1:2000, castelamarin caused a constriction of the coronary vessels of an isolated mammalian heart, the outflow being reduced to $\frac{1}{3}$ or less.—*F. E. Denny*.

5908. CHRISTENSEN, C. Exzemplanter. Plants producing eczema.] Nat. Verden 6: 259-276. Fig. 1-8. 1922.—Dermatitis venenata may occur as a result of continued occupation with *Narcissus* spp. (lily disease of Scilly Islands), and may even become chronic. Under unfortunate circumstances dermatitis may also be caused by otherwise harmless plants, e. g., *Arctium lappa*, *Angelica*, *Colchicum*, *Convallaria*, *Doronicum*, pumpkin, *Delphinium*,

Humulus, Pastinaca, Euphorbia, Heracleum. Certain woods used for fine furniture contain poisons having a similar effect. Of plants having poison in hairs, *Primula obconica* and, to a lesser degree, *P. sinensis*, *P. mollis*, *P. Sieboldi*, *P. cortusoides*, and *P. Arendsi* are known as eczema plants. They produce less poison when well watered. Washing with alcohol immediately after handling the plants is recommended. Of plants with eczema-producing milk or gum, *Rhus toxicodendron* is well known, but other species should also be indicated.—*Ernst Gram.*

5909. DEAN, A. L., AND R. WRENCHALL. **Making Chaulmoogra oil derivatives.** Pharm. Era 55: 277, 278. 1922.—The authors describe routine methods used at the University of Hawaii for making certain derivatives of Chaulmoogra oil for therapeutic use.—*C. M. Sterling.*

5910. DODD, SYDNEY. **Poisoning of sheep by "Narrawa burr," *Solanum cinereum*.** Agric. Gaz. New South Wales 34: 257-260. 1923.—A sheep fed the berries emulsified in water died within 7 hours, with symptoms of salivation, perspiration, disordered cardiac and respiratory actions, and diarrhoea. The active toxic agent is probably solanin. *L. R. Waldron.*

5911. GIROLA, CARLOS D. **Cultivo de la Yerba Mate en Argentina. Composicion del *Ilex paraguariensis*.** [Cultivation of Yerba Mate in Argentina. Composition of *Ilex paraguariensis*.] Bol. Ministerio Agric. Nacion [Argentina] 27: 186-219. 4 fig. 1922.—The author summarizes all previous work covering analyses of *Ilex paraguariensis*, the plant yielding Yerba Mate or Paraguay tea, with particular reference to the ash and to fresh and dried leaves and their products. [See also Bot. Absts. 12; Entries 5661, 5662.].—*John A. Stevenson.*

5912. GIROLA, CARLOS D. **Plantas medicinales. Posibilidad del cultivo de las especies exoticas en Argentina.** [Medicinal plants. Possibility of the culture of exotic species in Argentina.] Bol. Ministerio Agric. Nacion [Argentina] 25: 175-209. 1920.—The author outlines the progress in the study of medicinal plants in the U. S. A., Uruguay, Brazil, Chile, Paraguay, Canada, and various European countries. A list of medicinal plants cultivated in the botanical garden at Buenos Aires is given.—*John A. Stevenson.*

5913. HART, FANCHON. ***Curatella americana*.** Druggists Circ. 66: 296, 314. 4 fig. 1922.—This is the 1st plant reported upon from the collection made by Rusby of the Mulford expedition to South America. The writer describes the tree, its habitat and uses, and reports a microscopical study of the leaves, which, because of their rough, flinty trichomes, are used as substitute for sandpaper for polishing canes and other wood-work. The bark is used as an astringent.—*C. M. Sterling.*

5914. HAVERMANN, AUG. **Plaatselijke dier- en kruidkunde.** [Local zoology and botany.] Natuurw. Tijdschr. 4: 184-190. 1922.—In Belgium *Datura stramonium* seed are given to hogs to lengthen sleep and to stimulate appetite, although many deaths result from this practice.—*J. C. Th. Uphof.*

5915. KRAEMER, HENRY. **The wealth of our doors.** Druggists Circ. 66: 431, 432. 1 fig. 1922.—This is an account of the introduction and distribution of *Hyoscyamus* in Montana.—*C. M. Sterling.*

5916. SHIFLETT, B. O. **Common medicinal plants.** Amer. Druggist and Pharm. Rec. 70: 1922.—The value of botany to the pharmacist is emphasized and drug plants native to Alabama are listed.—*C. M. Sterling.*

5917. SIMONSEN, JOHN LIONEL, AND MADYAR GOPAL RAU. **The constituents of Indian turpentine from *Pinus longifolia* Roxb. Part II.** Jour. Chem. Soc. [London] 123: 549-560. 1923.

5918. YOUNGKEN, H. W. *A text book of pharmacognosy*. $x + 533 p.$, 210 fig. P. Blakiston's Son and Co.: Philadelphia, 1921.—The text is divided into 2 parts. Part 1 embraces 2 chapters, 1 of which deals with fundamentals such as the occurrence of crude drugs, causes of their variation in quality, definitions, collection of drugs, curing of drugs, garbling, valuation of drugs, drug preservation, and a brief history of the subject. The other considers crude vegetable drugs from the morphological standpoint. Part 2 deals with the taxonomy of crude drugs, and embraces 2 chapters in which crude drugs of vegetable and animal origin are respectively treated as to division, class, family, synonyms, natural origin, part used, limit of impurities, ash, habitat, description of plant or animal yielding drug, commercial source, description of drug, microscopical characteristics, powdered drug, constituents, adulterants, and substitutes.—*Author's abstract.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

WILLIAM J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 5289, 5317, 5342, 5375, 5422, 5432, 5437, 5438, 5439, 5440, 5441, 5484, 5562, 5633, 5741, 5752, 5785, 5805, 5806, 5807, 5820, 5838, 5839, 5841, 5845, 6026, 6030, 6031, 6032)

GENERAL

5919. ANONYMOUS. [Rev. of: PALMER, LEROY S. *Carotinoids and related pigments: the chromolipoids* 316 p. (American Chemical Society Monograph Series.) The Chemical Catalog Co.: New York, 1922 (see Bot. Absts. 12, Entry 2763).] *Nature* 111: 318-319. 1923.

5920. HILL, A. V. *Hydrogen ion concentration*. *Nature* 111: 434-436. 1923.—This is a general discussion of the subject.—O. A. Stevens.

5921. HUTCHINSON, C. M. *Report of the Imperial Agricultural Bacteriologist*. Sci. Rept. Agric. Res. Inst. Pusa 1921-22: 38-43. 1922.—Work was done on nitrogen fixation; symbiosis between algae and nitrogen-fixing bacteria; plant residues as nutrients for nitrogen-fixing bacteria; and on cross inoculations with nodule bacteria. Studies on nitrification of *Bassia latifolia* cake and solubilization of rock phosphates by composting were continued. The most effective compost tried consisted of 50 gm. *Bassia* cake, 25 gm. nodule phosphate, and 6.25 gm. sulphur, and this yielded 4.32 per cent of citrate-soluble phosphate (P_2O_5). The study of nitrogen loss from cattle dung and urine stored under various conditions was continued. Burned soil from the Konkan Division contained more nitrogen (as ammonia) than the fresh soil. Experimental plots were laid down for the study of sodium nitrate as a fertilizer in connection with irrigation; the vertical distribution of nitrates in the soil; and the influence of cultivation, rainfall, and applications of nitrate on nitrification.—The study of the classification and efficiency of indican hydrolyzers, and experimental work on small apparatus for local manufacture of the sterilizer "E. C." were carried on. A program of work for 1922-23 and a list of publications for the year are appended.—Winfield Dudgeon.

PROTOPLASM, MOTILITY

5922. DANGEARD, P. A., ET PIERRE DANGEARD. *Sur la vitalité des feuilles d'Aucuba conservées dans le vide*. [The vitality of the leaves of *Aucuba* preserved in a vacuum.] *Compt. Rend. Acad. Sci. Paris* 176: 49-53. 1923.—In conformity with the experiment of Maquenne and Demoussy [see Bot. Absts. 12, Entry 4567] adult leaves of *Aucuba* were kept in a vacuum in light for 6 months and still retained their vitality. The cells were all alive, there being no apparent difference between the cells of the treated leaves and of those still remaining on the tree. Two proofs that life still existed are given: (1) there was observed a streaming of the protoplasm within the cells. This is especially true of the epidermal cells, the guard cells, and the cells near the veins. (2) Intravital staining with neutral red and cresyl blue. These dyes

accumulate in the vacuole, leaving the nucleus, cytoplasm, and plastids unstained. In all these respects the exposed and control leaves behaved the same, both in living and fixed material.—*C. H. Farr.*

5923. FUNK, GEORG. Über Bewegungen der Kolonien von *Oscillatoria amphibia* Ag. [Movements of the colonies of *Oscillatoria amphibia*.] Beih. Bot. Centralbl. I Abt. 39: 257-320. Pl. 17-18. 14 fig. 1923.—The colonies contract by the creeping together of the filaments and thin out by the moving out of the individual filaments. Contraction of the whole colony results from mechanical stimulus, darkening, increased light, cooling, and heating.—*L. Pace.*

DIFFUSION, PERMEABILITY PHYSICO-CHEMICAL PHENOMENA

5924. CHURCHMAN, JOHN W. The mechanism of selective bacteriostasis. Proc. Nation. Acad. Sci. [U. S.] 9: 78-81. 1923.—While most of the triphenylmethane stains kill or inhibit gram-positive bacteria but do not readily affect gram-negative forms, the author finds that acid fuchsin has a similar selective effect on gram negative bacteria. Such selective effects do not seem to depend on penetrability; stained bacteria may grow and unstained ones may be inhibited. The bacteriostatic effect evidently is "a paralysis of reproduction," not always leading to death. Bacteriostasis due to staining before culturing is defined as intrinsic, and that due to dye in the culture medium as extrinsic. With gentian violet, intrinsic and extrinsic bacteriostasis are parallel, a given organism being inhibited or not in both cases; with acid fuchsin, 1 of 2 organisms may show intrinsic bacteriostasis only, and the other, extrinsic only.—*Howard B. Frost.*

5925. DORNER, ALFRED. Über das Verhalten der Zellwand zu Kongorot, insbesondere bei Farnprothallien. [The behavior of the cell wall to congo red, especially in fern prothallia.] Centralbl. Bakt. II Abt. 56: 14-27. 1922.—This investigation was undertaken to test Klebs' theory that congo red is a differential stain for living and dead cell walls. Fern prothallia as well as material from a number of higher and lower plants were studied in this respect. It was found that no absorption took place in any case where the presence of a cuticle could be demonstrated. However, when cutinized cell walls were treated with cutin solvents the dye was readily taken up.—*Anthony Berg.*

5926. DORNER, ALFRED. Über die Aufnahme von Anilinfarbstoffen in das Protoplasma und die Zellwand. (Sammelreferat.) [The absorption of aniline dyes by the protoplasm and the cell wall.] Centralbl. Bakt. II Abt. 56: 27-31. 1922.—This is a résumé of the theories promulgated by the various investigators on the absorption of these dyes.—*Anthony Berg.*

5927. KAKIUCHI, SAMURO. Studies on physico-chemical properties of phospholipin. I. The precipitation of lecithin-hydrosol by electrolytes. Jour. Biochem. Tokyo 1: 165-174. 1922.—Lecithin particles in aqueous solution are negatively charged; salts with a monovalent cation exert no precipitating action; bivalent cations precipitate over a wide range of concentration; trivalent cations precipitate only within a very narrow range of concentration and at very great dilution, causing resolution of the precipitate if the concentration of electrolyte be too great. The valency of the anion of the salt used plays a role in the result; monovalent anions are practically without effect upon the concentration of trivalent cation required to precipitate, while the presence of divalent or tetravalent anions with their large negative charges necessitates a material increase in the concentration of cation necessary to precipitate. Many supposed instances of antagonism between salts with monovalent and bivalent cations are in reality due to antagonism between cations and anions.—*Joseph S. Caldwell.*

5928. KOTAKE, YASHIRO, AND M. OKAGAWA. Über den Einfluss des optischen Drehungsvermögens auf die Zell-permeabilität. I Mitteilung. [The influence of optical rotation upon cell-permeability.] Jour. Biochem. Tokyo 1: 159-164. 1922.—Of the 3 forms of oxyphe-nyl-lactic acid, the red corpuscles of the dog are readily permeable only to the laevorotatory

form, slightly permeable to the dextrorotatory form, and not at all to the inactive form. Optical activity may play a rôle of unsuspected importance in biological and physiological relations.—*Joseph S. Caldwell.*

5929. PRICE, THOMAS SLATER. Determination of the isoelectric point of gelatin. A criticism of Patten and Kellems's method. Jour. Chem. Soc. [London] 123: 410-412. 1 fig. 1923.

5930. STILES, WALTER. Permeability. New Phytol. 21: 169-209, 233-251. 1922; 22: 1-29, 72-94. Fig. 13-14. 1923.—After a general statement, with a definition of turgidity, in Chapter IX the quantitative water relations of the cell are considered on the basis of the simple osmotic view. The net pressure sending water into the cell is called the "suction pressure." The 3 methods most used for the determination of the isotonic coefficient are given, and 3 methods for determination of the osmotic pressure of the cell. The magnitude of the osmotic pressure and the relation between the position of a cell in the plant and its osmotic pressure are discussed, along with the relation of habit to osmotic pressure, the influence of external conditions, and the phenomenon of periodicity in the pressure values. Other subjects included are the substances responsible for osmotic pressure, the suction pressure and its determination, the magnitude and range of suction pressures, exudation and root pressure, the inadequacy of the simple osmotic view, the water relations of the cell wall and of the protoplasm, and the effect of imperfect permeability of the cell wall and of tissue tensions on the water relations of cells. Chapter X is devoted to a consideration of the influence of temperature and of the composition of the external medium on the intake and excretion of water in plants. The effect of temperature has been studied by the plasmolytic method, by the rate of linear shrinkage of turgid tissues, and by "the change in weight method." The effect of the composition of the external medium is discussed with special reference to sucrose, sodium chloride, ethyl alcohol, octyl alcohol, chloroform, mercuric cyanide, sulphuric acid, osmic acid, mercuric chloride, ethylic acetate, and the phenols.—In Chapter XI the author considers the methods for determining the permeability of plant cells to dissolved substances. These methods are: direct observation of visible changes, microchemical tests, analysis of expressed sap or tissue extracts, visible changes in the external medium, chemical analysis of the external medium, electrical conductivity of the external solution, electrometric measurements with the hydrogen electrode, colorimetric estimation of the H-ion concentration of the external solution, metabolic action, plasmolysis, weight or volume changes in turgid tissues, tissue tension, diffusion, and electrical conductivity of living tissues—Chapter XII consists of a discussion of "quantitative relations in the penetration of dissolved substances into plant cells." The subheads are: "the unequal absorption of the ions of a salt by plant tissue," "the position of the equilibrium attained in the intake of dissolved substances by plant cells," and "the course of absorption of dissolved substances."—*I. F. Lewis.*

5931. TADOKORO, TETSUTARO. The antagonistic action between salts on the surface tension of organic colloidal solution. Jour. Biochem. Tokyo 2: 361-365. 1923.—The alterations in surface tension of expressed, centrifuged vegetable juices and horse serum produced by additions of single salts or of antagonistic pairs of salts were determined by means of Nouy's surface tension apparatus. A mixture of antagonistic salts preserves the surface tension unaltered while each of the single salts depresses it, but the alterations produced are small and there are many irregularities.—*Joseph S. Caldwell.*

5932. TADOKORO, TETSUTARO, AND YUKIHIKO NAKAMURA. On the difference between the adsorptive powers of charcoal from common and glutinous starch. Jour. Biochem. Tokyo 2: 239-250. 1923.—Certain varieties of rice, millet, and Italian millet possess starch which gives with iodine a red or purple color; these are the so-called glutinous varieties. Starches made from glutinous and common varieties of each of the 3 grains were purified, converted into charcoal, and tested for adsorption of iodine in potassium iodide. The adsorption was in all cases materially greater in the glutinous starch charcoals. Impregnation of the glutinous

starch charcoal with potassium or calcium chloride increased its adsorptive capacity, calcium nitrate and tannin were without effect, and iodine in potassium iodide decreased adsorptive capacity. The adsorptive capacity of the gel from glutinous starch was greater than that from common starch; it also requires a larger quantity of tannin to precipitate it, and the surface tension as measured by Nouy's apparatus changes abruptly with increase of tannin, while a gradual change occurs in common starch so treated.—*Joseph S. Caldwell.*

WATER RELATIONS

5933. BOSWELL, VICTOR R. Dehydration of certain plant tissues. *Bot. Gaz.* 75: 86-94. *Fig. 1-7.* 1923.—Under oven dehydration at 60°C. the author's data, taken at 15-minute intervals, showed that cabbage leaves lost water less rapidly than did tomato leaves. Contrasting results were also found in tender (greenhouse-grown) and hardy (coldframe-grown, March) cabbage leaves. Tomato leaves similarly grown showed little difference. Greenhouse-grown cabbage leaves, produced from plants which were watered with (1) tap water, (2) $\frac{N}{10}$ NaCl, (3) $\frac{N}{10}$ NaNO₃, gave results indicating a relation of hardness to these treatments, the tap water producing the tender leaves and the NaNO₃ the hardest leaves. The author's graphs "show conclusively that there is a close correlation between the degree of hardness and the rate of water loss." The author finds that hardy tissue loses its water more slowly in the early periods than does the tender tissue. "The results suggest that the method of drying described in the present paper may be used to estimate the relative amounts of free and unfree water in plant tissues, and that the comparative rates of water loss under uniform drying conditions are a measure of the relative hardness of certain kinds of plant tissues."—*B. W. Wells.*

5934. PRIESTLEY, J. H., AND R. M. TUPPER-CAREY. Physiological studies in plant anatomy. IV. The water relations of the plant growing point. *New Phytol.* 21: 210-229. *Fig. 1-2.* 1922.—In *Vicia Faba* it is shown that fluid under pressure does not penetrate the meristem at the root apex. A pressure of 1 atmosphere failed to cause the penetration of aqueous eosin, while the meristem resisted a pressure of 2 atmospheres without penetration of malachite green. The meristem of the root tip "is relatively impermeable to the diffusion of salts in solution and acid dyes but stains very readily with basic dyes." The resistance of the living root meristem varied from 2,000 to 10,000 ohms, while in killed roots the resistance fell to a few hundred ohms. In root tips taken from the dry bean and soaked 1 hour in water, the resistance of the meristem averaged 12-13,000 ohms.—On the other hand "the stem apex allows relatively free diffusion of water and solutes within the cuticle, the meristematic protoplasts at the apex staining readily with acid dyes. * * * The sap contained in the endodermal cylinder of the root is apparently more acid than the sap irrigating the stem apex. * * * The relative ease with which the apical meristem of the stem is irrigated with substances, as compared with the supply of these substances to the root apex, is shown to suggest a physiological basis for the important morphological differences characteristic of these 2 growing points."—The experimental results are in direct conflict with Coupin's theory that the growing point is the chief organ of the root for the absorption of water and solutes.—*I. F. Lewis.*

MINERAL NUTRIENTS AND SALT RELATIONS

5935. HAAS, A. R. C. Pot cultures with barley in soil from a long-time fertilizer experiment. *Bot. Gaz.* 75: 95-102. *Fig. 1-4.* 1923.—The soil used to test the effects of the fertilizers was from the orange and lemon tree plots of the Citrus Experiment Station, Riverside, California. The purpose of the experiment was to discover whether or not a cereal like barley would respond to the various combinations of fertilizers in a manner similar to the citrus plants. The author finds a "lack of agreement between the barley-producing form of soils and the yield and condition of citrus on such soils at the time the samples were taken." On a plot fertilized by nitrate, blood, and potassium sulphate, much less grain was produced than would be assumed from the yield of citrus. The writer was further able to demonstrate that the amount of nitrogen previously added to the soil is not an accurate measure of its barley-producing power, and also that "the addition of phosphoric acid or potash to the soil studied has not shown any added advantages for the growth of barley."—*B. W. Wells.*

5936. HESSELINK, E. Zoutwaterschade bij Grienden aan het Hollandsch Diep. [Salt-water injury near Grienden on the Hollandsch Diep.] *Cultura* 35: 67-71. 2 pl., 1 fig. 1923.—An account is presented mainly of the influence of seawater upon willows in inundated fields. It was not difficult to show by flame reaction the presence of NaCl in willow twigs. Not all species are susceptible to the same degree. *Salix viminalis* is most susceptible, then follows *S. amygdalina*, still less *S. vitellina*, and most individuals of *S. alba* are not harmed at all. Also, *S. purpurea* was often badly damaged. It was observed that injury was least in a field where the ditches were cleaned the previous winter, and the mud thrown between the shrubs. It is supposed that it prevented the seawater entering the lower layers of the soil and salt was thus unable to reach the roots. In the field where the ditches were not treated the damage was considerable. There was less NaCl toward the base of the twigs than in the top, which explains why damage is first noticed on the leaves. Cuttings were grown in pots in order to observe the influence of salt water. On May 16 tap water was mixed with 20 per cent seawater, and after 2 days no harmful influence was noticed. During the next 2 days the cuttings were watered with pure seawater and after 2 days all plants were killed.—*J. C. Th. Uphof*.

5937. MÜLLER, WILHELM. Über die Abhängigkeit der Kalkoxalatbildung in der Pflanze von den Ernährungsbedingungen. [The dependence of calcium oxalate formation in plants on the nutritive condition.] *Beih. Bot. Centralbl.* 1 Abt. 39: 321-351. 1923.—Amars and Benecke showed that calcium oxalate formation in green plants depends on nutrition. Calcium oxalate crystals, whether in living or dead cells, are not dissolved in the assimilation processes of any plant, but in contact with the roots such crystals were attacked and corroded. The raphide content did not vary with different nitrogenous sources, and was influenced only by calcium supply. In the absence of nitrogenous material the raphide content is unchanged. Raphide formation requires less calcium than the formation of other oxalate crystal. Light does not influence the formation of raphides. The greater part of the investigation confirms Stahl, whose work appeared after this work was completed.—Plants used in the experiment were *Callisia repens* L., *Stellaria media*, *Impatiens parviflora* DC., *I. Sultani* Hook., *Mimosa Spegazzinii*, *Nicotiana Tabacum*, *Solanum tuberosum* L., *Datura Stramonium* L.—*L. Pace*.

5938. SNELL, KARL. Die Kartoffel in Sand- und Wasserkulturen. [The potato in sand and in water cultures.] *Illus. Landw. Zeitg.* 43: 59-60. 1923.—The experiments showed the extremely favorable results from the presence of potassium salts in the culture media. In both sand and water cultures the plants matured, producing all parts including tubers. In the water cultures the tubers possessed enlarged white lenticels and the leaves became rolled in late summer as usually occurs in the field when there is insufficient water. The author suggests that the curling was probably due to a lack of necessary salts, since the salt solution was not renewed.—*John W. Roberts*.

PHOTOSYNTHESIS, PHOTOCHEMISTRY

5939. HEILBRON, I. M. The photosynthesis of plant products. *Nature* 111: 502-504. 1923.—This article is an abstract of lectures delivered at the Royal Institution on Feb. 1 and 8, and it contains references to the work of Willstätter and more especially to that of Moore and Webster on carbohydrate production. Several investigations in nitrogen assimilation are referred to. "Photosynthesis is in the main the chemistry of one single substance—formaldehyde."—*O. A. Stevens*.

5940. NOYES, W. ALBERT, AND A. B. KOUPERMAN. Photochemical studies I. The photochemical decomposition of solid oxalic acid. *Jour. Amer. Chem. Soc.* 45: 1393-1400. 1923.

METABOLISM (GENERAL)

5941. ARNOLD, R. Application du procédé biochimique de caractérisation du glucose aux fruits de *Viburnum opulus* L., à l'extrait de Quinquina rouge et à des extraits de Cola. [Application of the biochemical method to the identification of glucose in fruits of *Viburnum*

opulus L., and in extracts of red cinchona and kola.] Bull. Soc. Chim. Biol. 3: 547-566. 1921.—Continuing earlier work by Bridel and Arnold [see Bot. Absts. 12, Entry 5189] in which methods for preparation of material for study were described, the present article reports results with the 3 materials named. 100 gm. of unripe fruits of *Viburnum opulus* contained 5.766 gm. of reducing sugar, increasing to 6.232 gm. after treatment with invertase, but showing no further increase after the action of emulsin. By submitting the mixture of reducing sugars to the action of emulsin in 50 per cent methyl alcohol and determining the amount of sugar converted into *b*-methylglucoside, it was found that dextrose constituted 56.6 per cent of the mixture of reducing sugars. That the remainder was levulose was indicated by the optical rotation. Red cinchona extract prepared according to the Codex of 1908 contained 9.78 per cent reducing sugars, of which 43.6 per cent was dextrose as determined by conversion into methylglucoside. Extract of kola made according to the Codex of 1908 was compared with a preparation made from the fresh nut. In the official extract, 53.7 per cent of the reducing sugars was dextrose; when the extract was subjected to hydrolysis with sulphuric acid followed by treatment for 140 days with emulsin renewed at 30-day intervals the dextrose found was 43.95 per cent of the reducing sugar. An extract of the fresh kola nut was very slowly acted upon by emulsin, 21.78 per cent of the reducing sugar present being dextrose. After H_2SO_4 hydrolysis the dextrose present was 48.8 per cent of the reducing sugar. The "biochemical method" as applied to plant material consists in the destruction of enzymes by placing the material in boiling alcohol, extracting with water, clarifying with lead subacetate, removing excess lead with H_2S , extracting with boiling acetic ether to remove lipoids, resins, alkaloids, and glucosides, dissolving out the sugars with boiling 95 per cent alcohol, evaporating to dryness, dissolving in 50 per cent methyl alcohol, and adding emulsin after previous determination of reducing sugar in an aliquot. Repeated additions of emulsin may be necessary to bring the reaction to completion, and complete extraction of sugars with 95 per cent alcohol is difficult in such material as red cinchona.—*Joseph S. Caldwell.*

5942. BOAS, FRIEDRICH. Untersuchungen über Säurewirkung und Bildung löslicher Stärke bei Schimmelpilzen. II Teil. [Acidity and the formation of soluble starch in mucors. Part II.] Centrabl. Bakt. II Abt. 56: 7-11. 1922.—The H-ion concentration, nature of the carbohydrate source, and temperature are important factors in the formation of soluble starch. Saccharose, levulose, dextrose, maltose, and galactose stimulate the formation of diastase in the order named. The presence of diastase in the nutrient solution inhibits the appearance of soluble starch. In *Aspergillus niger* there seems to be a relationship between the formation of diastase and conidia formation; maltose and galactose seem to favor conidia production. In *Aspergillus Oryzae* maltose favors the appearance of soluble starch in the nutrient solution; levulose seems to inhibit it.—*Anthony Berg.*

5943. DELAUNEY, P. Nouvelles recherches relatives à la présence de la loroglossine dans les Orchidées indigènes. [The presence of loroglossin in indigenous orchids.] Compt. Rend. Acad. Sci. Paris 176: 598-600. 1923.—Eleven species are added to the list of those in which this substance has been found. This makes a total of 17 species of indigenous orchids belonging to 5 genera, namely: *Loroglossum*, *Orchis*, *Ophrys*, *Cephalanthera*, and *Epipactis*.—*C. H. Farr.*

5944. GOTO, KIKO. The nature of the carbohydrates in the leaf, stem and tuber of *Amorphophallus Konjaku* and their variations in amount under different conditions. Jour. Biochem. Tokyo 1: 201-211. 1922.—The mature resting tubers contained 58.8 per cent mannan, 18.85 per cent starch, 0.57 per cent dextrose, and 1.2 per cent levulose. Mannan and starch are depleted together as the growth of the new plant begins, and both are found in all parts of the plant at all stages of growth. Starch wholly disappears from leaf and stalk and only a trace remains in the tuber when vigorously growing plants are placed in the dark for 2 months. Dextrose and levulose are found in the leaves and stalks in approximately equal amounts and are the only sugars found; tests for sucrose, mannose, pentose, and methyl pentose made upon stems, leaves, and stalks of growing plants invariably gave negative results.—*Joseph S. Caldwell.*

5945. HERISSEY, H., ET P. DELAUNEY. Présence dans plusieurs Orchidées indigènes de glucosides fournissant de la coumarine par hydrolyse. [Presence in several indigenous orchids of glucosides yielding coumarin on hydrolysis.] Bull. Soc. Chim. Biol. 3: 573-579. 1921.—Coumarin in the free state is not present in *Orchis purpurea* Huds., *O. Simia* Lam., or *O. militaris* L. It can be isolated from each of these after the plant has been subjected to digestion by a preparation of its own enzymes, to hydrolysis by dilute sulphuric acid, to slow drying at a low temperature, or to successive treatment with invertase and emulsin. It is accompanied by an oily substance having the characteristic odor of orchids, which interferes with crystallization. The glucoside which yields coumarin is distinct from loroglossin. No coumarin could be obtained from *Orchis maculata* L. or *O. conopsea* L.—*Joseph S. Caldwell.*

5946. IRVINE, JAMES COLQUHOUN, AND EDMUND LANGLEY HIRST. The constitution of polysaccharides. Part VI. The molecular structure of cotton cellulose. Jour. Chem. Soc. [London] 123: 518-532. 1923.

5947. KOGANEI, RYOICHI. Studies on the fatty substances of tubercle bacilli and their acid-proof staining property. Jour. Biochem. Tokyo 1: 355-364. 1922.—Successive extractions with cold and hot alcohol, ether, and acetone divided the lipid material into 3 fractions. The portion soluble in hot alcohol yielded an ether-insoluble fraction which contained phrenosin, kersin, and sphingomyelin. The acetone-soluble portion consisted principally of glycerides but no cholesterol. The ether-soluble, acetone-insoluble portion was made up of about 20 per cent of kephalin and 80 per cent of tubercle-wax closely approximating cetin in its physical properties. Each of the new constituents was tested in pure form as to its acid-proof staining properties, with the result that kephalin, whether from tubercle bacilli or from ox brain, yielded an intense acid-proof color with the Ziehl-Neilsen's stain. This was not the case with sphingomyelin, kersin, phrenosin, cetin, palmitic acid, and various glycolipins which were subjected to the test.—*Joseph S. Caldwell.*

5948. KOMATSU, SHIGERU, AND HIDENOSUKE UEDA. On the biochemical study of the ripening of the Kaki-fruit I. Chemical composition of the fruit. Jour. Biochem. Tokyo 1: 181-194. 1922.—Non-astringent and astringent varieties of *Diospyros Kaki* when examined by ordinary methods of analysis show no differences which account for the differences in astringency. The authors made a detailed examination of mature fruits of 2 astringent and 2 non-astringent varieties which were found to differ only very slightly in their sugar content. In all cases, sucrose made up less than 10 per cent of the total carbohydrate, the remainder consisting of a mixture of dextrose and levulose in which dextrose predominates. The tannin of both varieties, when prepared free from polysaccharids, reduces Fehling's solution. The pectins of sweet and astringent varieties differ very considerably in their elementary composition from each other and are to be further investigated.—*Joseph S. Caldwell.*

5949. KOMATSU, SHIGERU, AND HIDENOSUKE UEDA. On the biochemical study of the ripening of the Kaki-fruit. II. Jour. Biochem. Tokyo 2: 291-300. 1923.—The transformation of the carbohydrates during the ripening of a sweet (non-astringent) variety of persimmon known as Ansai, were studied in a series of 16 samples collected over the period Sept. 20-Dec. 7. The 1st samples were green and strongly astringent. Ripening occurred early in October, as indicated by color and flavor, while increase in weight of the fruit continued to Nov. 2. Expressed as percentages of dry matter, there is a progressive though somewhat irregular increase in total sugars from 57.36 per cent on Sept. 21 to 70.16 per cent on Nov. 15, after which there is a decrease to 63.37 per cent on Dec. 7. The curve for reducing sugars runs closely parallel with this, the figures being 56.28 per cent on Sept. 21, 66.08 per cent on Nov. 15, and 62.30 per cent on Dec. 7. Cane sugar increases from 1.08 per cent on Sept. 21 to a maximum of 5.29 per cent on Oct. 14, fluctuates between 4.94 per cent and 3.82 per cent from Oct. 16 to Nov. 15, and drops to 1.07 per cent on Dec. 7. Glucose at all times exceeds fructose, the glucose-fructose ratio being 1.62:1 on Sept. 21, rising to 1.85:1 on Oct. 3, then remaining fairly close to 1.60:1 until Nov. 15, when it drops to 1.19:1. Acidity, expressed as malic acid, was 0.94 per

cent on Sept. 21, decreasing steadily to a minimum of 0.333 per cent on Oct. 24, after which it increased again to 0.436 per cent on Nov. 15 and Dec. 7. Tannin, estimated as gallotannin, made up 4.28 per cent of the dry weight on Sept. 21, decreasing to 0.604 per cent on Oct. 10, remaining about this point to Oct. 24, when it dropped to 0.34 per cent, with a further decrease to 0.18 on Dec. 7. Polysaccharids and crude fiber make up 4.5 and 7.2 per cent, respectively, of the dry weight on Sept. 21, both decreasing somewhat irregularly to 2.44 and 5.53 per cent on Dec. 7. The yield of pentose obtained upon acid hydrolysis of the polysaccharids increased steadily up to Nov. 15, then fell off; the yield of hexoses was fairly constant up to Oct. 24, after which it steadily declined. Pectin constituted 4.9 per cent of the total dry weight on Sept. 21, increased to 6.30 per cent on Sept. 30, decreasing with irregular fluctuations to 3.03 per cent on Nov. 2, and remained practically constant after that date. Extraction of the water-insoluble residue with sodium carbonate showed that the decrease in soluble tannin was due to its conversion into a brown insoluble form. The authors "find no chemical evidence in our results to support the theory that the shibu (tannin) becomes insoluble on combining with pectin or some other substance," as Kumagai and Tozaki (Jour. Sci. Agric. Soc. Japan No. 236.360. 1922) have suggested. They regard the shibu as a phlobatannin.—*Joseph S. Caldwell.*

5950. KOMATSU, SHIGERU, HIDENOSUKE UEDA, AND MOTARO ISHIMASA. On the biochemical study of the ripening of the Kaki-fruit III. Chemical composition of the cured fruit. Jour. Biochem. Tokyo 2: 301-308. 1923.—An astringent variety of persimmon (Momidzu) was "cured" to remove astringency in each of 3 ways—by immersion in warm water, by placing in alcohol vapor, and by peeling and drying in the sun. Dry samples of a number of other astringent varieties were also examined. The white powder which collects upon the surface of the sun-dried fruits is composed of 90 per cent dextrose and 10 per cent levulose, although the 2 sugars are present in the fruit in approximately equal quantities, or with glucose slightly in excess. Sucrose was absent from the fruit cured in warm water, and present as a trace only in that cured in alcohol vapor. Sun-dried fruits contained small amounts, less than 1 per cent, of sucrose. The pectin and tannin of the dry samples of different varieties showed considerable varietal differences, being 1.4 per cent and 0.13 per cent, respectively, for the variety Dôjôhachiya, 0.48 per cent and 0.66 per cent for Oshiba.—*Joseph S. Caldwell.*

5951. KOMATSU, SHIGERU, AND HIDENOSUKE UEDA. On the biochemical study of the ripening of the Kaki-fruit IV. Chemistry of the curing process. Jour. Biochem. Tokyo 2: 309-313. 1923.—The chemical changes occurring in 3 astringent varieties of persimmon, Yakigaki, Marugaki, and Momidzu, during slow desiccation in the air were studied in comparison with samples of Momidzu "cured" (rendered non-astringent) by immersion in warm water and treatment with alcohol vapor. When Momidzu fruits containing 18.1 gm. reducing sugar in which the glucose-fructose ratio was 1.7:1 were cured in warm water [temperature and length of immersion not stated] the reducing sugar content decreased to 13.9 gm. with a glucose-fructose ratio of 1.4:1. In other samples cured in alcohol vapor [details of treatment not stated] the reducing sugar content decreased to 15 gm. with a glucose-fructose ratio of 1.5:1. The soluble tannin content of the water-cured fruit was 14.2 per cent, that of the alcohol-cured fruit 5.9 per cent, of that of the fresh fruit. Fruits of Momidzu desiccated by exposure to the air for 210 days contained only 11.3 gm. reducing sugar with a glucose-fructose ratio of 1.3:1. In the same period and under the same treatment Yakigaki lost 43 per cent of its reducing sugar and had the glucose-fructose ratio decreased from 1.5:1 to 1.1:1, while Marugaki lost 40 per cent of its sugar with an alteration of the glucose-fructose ratio from 1.6:1 to 1.4:1. That the loss of dextrose is proportionately greater than that of levulose is due primarily to the greater ease with which it is decomposed in respiration, in minor degree to the fact that the deposit of crystallized sugar upon the surface of the dried fruits is about 90 per cent dextrose. The authors ask, but do not answer, the question whether the composition of this deposit is due to a difference in the velocities of diffusion of the 2 sugars through the cell membranes or to other reasons. That the desiccated fruit is apparently sweeter than that cured by other processes is due to the larger proportion of levulose present after drying. The ripening of a non-astringent variety, Ansai [see Bot. Absts. 12, Entry 5949], and the air-drying of the astringent varie-

ties are similar in that the outstanding changes in both cases are reduction of soluble tannin by conversion to an insoluble form, decrease in acid content, and decrease of the glucose-fructose ratio.—*Joseph S. Caldwell.*

5952. LINDET, L., ET P. NOTTIN. Évolution des grains de féculé dans le tubercle de la pomme de terre. [The development of the starch grains of the potato tuber.] *Compt. Rend. Acad. Sci. Paris* 176: 149-155. 1923.—A study is made of the development of the tubers as to increase in weight, quantity of starch, and increase in dimensions of starch grains. The sugar content varies from 0.5 to 1.5 per cent of the sap. The amylogene probably contains a mixture of the sugars sucrose, invert sugar, and perhaps maltose. Soluble starch might also be expected, but it could not be detected with anhydrous Na_2SO_4 or MgSO_4 . A study is made of the individual starch grains. By measuring the diameter of grains it was possible to calculate their volume and weight, the latter through weighing a million grains of the same size. A means is described for isolating grains of a common size. The formula, $P = 3.26 R^3$, gives the weight in mgm. of a starch grain, if R is the radius of the grain in microns. It is found that over half of the grains measure from 0μ to 10μ , but these comprise only 1.53 per cent of the total weight of starch grains. Only 0.6 per cent of the grains are from 60μ to 80μ . These comprise 19.2 per cent of the total weight. The maximum size is 100μ . The starch grains are about of equal size in all parts of the mature tuber. When the tubers sprout the starch grains nearer the buds become smaller. Simultaneously the sugar content increases to 70 per cent of the sap.—*C. H. Farr.*

5953. LING, ARTHUR ROBERT, AND DINSHAW RATTONJI NANJI. The preparation of xylose from maize cobs. *Jour. Chem. Soc. [London]* 123: 620-621. 1923.—The method is described in detail. The yield of pure xylose was 10-12 per cent of the weight of cobs used.—*F. E. Denny.*

5954. MANGENOT, G. Sur l'amidon des Algues Floridées. [The starch of the red algae.] *Compt. Rend. Acad. Sci. Paris* 176: 183-185. 1923.—In general the starch of the red algae is quite constant in character. With the iodine stain it varies from brown to violaceous. The form of the grains is variable. When of average size they are irregularly polyhedral; when very long they are either concave discoid or ovoid, with hilum and rings very faint. They are found in plastids in close association with the nucleus. The distribution of starch in the tissues is discussed and also the hydrolysis of starch into sugar.—*C. H. Farr.*

5955. MIYAKE, SUGURA. Chemical studies of corn pollen. I. Isolation of phytosterol and inosite. *Jour. Biochem. Tokyo* 2: 27-32. 1922.—The present work is a continuation of earlier studies reported by the author in *Jour. Soc. Agric. and Forest. Sapporo, Japan*, in 1919 and 1921. The results of Anderson and Kulp (Analysis and composition of corn pollen. *Jour. Biol. Chem.* 50: 433-453. 1922), who reported the presence of inosite in corn pollen, are confirmed, the author having obtained the pure crystals from the alcoholic extract of pollen previously extracted with ether in sufficient quantity to make melting point, combustion, and molecular weight determinations in addition to the usual color tests. Phytosterol was obtained from the ether extract, purified by recrystallization from absolute alcohol, and identified by melting point, solubility, and the usual color reactions. The nature of the carbohydrates of corn pollen (Southern Horsetooth Dent) is under investigation.—*Joseph S. Caldwell.*

5956. SHIBATA, NAGAMICHI. Zur Frage der Fettzersetzung einiger Saprophyten. [On the question of fat decomposition by certain saprophytes.] *Jour. Biochem. Tokyo* 1: 249-260. 1922.—Ten saprophytic organisms, including *Bacillus prodigiosus*, *B. proteus vulgaris*, *B. pyocyaneus*, *B. coli communis*, *B. subtilis*, *B. mesentericus*, a staphylococcus, a streptococcus, a vibrio, and a yeast, each in pure culture, were tested as to their ability to decompose fat, 1st upon a medium containing horse flesh of known fat content, later upon a synthetic protein-free medium. The latter consisted of 5 gm. NaCl , 2 gm. K_2HPO_4 , 6 gm. ammonium lactate, and 4 gm. asparagin per l. To 50 cc. of this solution 0.5 cc. of

neutral almond oil was added. Cultures were allowed to grow for 5, 15, 25, and 30 days at 30°C., and analyzed for fat content against sterile controls. The results indicate that *B. subtilis*, *B. pyocyaneus*, *B. mesentericus*, and the yeast accomplished the destruction of 1-2 per cent of the fat of the flesh and 2-5 per cent of the almond oil, but the results were rather irregular, being in one case 3 times as great in a 5-day as in a 30-day culture. The author concludes that the differences may be due to imperfect recovery of the unaltered fat from the cultures, and that the forms studied do not require fats for their development.—*Joseph S. Caldwell.*

5957. TERROINE, EMILE F., A. FEUERBACH, ET E. BRECKMANN. *Unité de métabolisme énergétique et masse active des organismes.* [The unity of the energy of metabolism and the active mass of the organism.] *Compt. Rend. Acad. Sci. Paris* 176: 462-464. 1923.—It has always been the dominant preoccupation of physiologists to determine the causes of the differences in the energy of metabolism of living things, and to find a unit of metabolism common to all. In 1882 it was recognized that the intensity of thermogenesis is governed by that of thermolysis, which in turn is a function of the cutaneous surfaces, and may be calculated by the law of surfaces. Recent studies tend to show that the conception of the law of surfaces is erroneous. Lapique maintains that the law of surfaces cannot be explained by the requirements of heat. Voit points out a correspondence between the intensity of metabolism and the active mass of the organism consisting of albuminoid material. Moulton found that in cattle the correlation of nitrogen was not with weight of body but with the surface. Palladin, in the study of plant respiration, formulated in 1896 a law that the intensity of respiration is rigorously proportional to the indigestible nitrogen, that is, to the nucleinic nitrogen, thus showing the relationship of the nucleus to respiration.—*C. H. Farr.*

5958. VERGELOT, CH. *Application de méthode biochimique de Bourquelot a l'étude de quelques plantes de la famille des Caryophyllées et de celle des Papilionacées.* [Application of Bourquelot's biochemical method to certain members of the Caryophyllaceae and Papilionaceae.] *Bull. Soc. Chim. Biol* 3: 513-519. 1921.—Aqueous extracts of entire fresh plants, previously plunged into boiling alcohol to destroy enzymes, were subjected to the action of invertase followed by emulsin, the optical rotation and the amount of reducing sugar being determined for each solution prior to the treatment and after the action of the enzymes. Data are given for 4 members of the Caryophyllaceae, *Saponaria officinalis* L., *Stellaria holostea* L., *Lychnis githago* Lam., *Lychnis dioica* DC.; and for 7 Papilionaceae, *Anthyllis vulneraria* L., *Genista sagittalis* L., *Ononis spinosa* L., *Ervum tetraspermum* L., *E. hirsutum* L., *Lotus corniculatus* L., and *Lathyrus pratensis* L. All contain a sugar hydrolyzable by invertase, but the application of Bourquelot's index of reduction indicates that in *Saponaria officinalis*, *Genista sagittalis*, *Ervum hirsutum*, and *Anthyllis vulneraria* this is some other sugar than saccharose. All except *Stellaria holostea* contain appreciable amounts of some substance hydrolyzable by emulsin and yielding reducing sugar, but no attempt to determine its nature was made.—*Joseph S. Caldwell.*

5959. WHITTIER, E. O. The determination of mucic acid. *Jour. Amer. Chem. Soc.* 45: 1391-1397. 1923.

METABOLISM (NITROGEN RELATIONS)

5960. FUENTE, CARLOS CASADA DE LA. Über das Reserve-Eiweiss in den Zellen von *Paconia*. [Reserve proteins in the cells of *Paconia*.] *Beih. Bot. Centralbl.* I Abt. 39: 352-354. Pl. 19. 1923.—Cells of root, stem, leaf epidermis, floral leaves, stamens, and fruit are shown after treatment with different substances. Many plants contain protein in solution. *Paconia albiflora* is especially favorable for the study of these proteins. Tests with caffeine, methyl green, ammonia, etc., are described.—*L. Pace.*

5961. HATTORI, GISABURO, AND SHIGERU KOMATSU. The prolamin of *Coix lacryma* L. *Jour. Biochem. Tokyo* 1: 365-369. 1922.—The alcohol-soluble protein, called coicin by Yoshimura and Sagara, was prepared in pure form by extraction of the finely ground kernels with

80 per cent alcohol, precipitating the concentrated extract with water, and repeating the solution and precipitation 4 times. The analysis of this product gave the following percentages: glutamic acid, 20.65; leucin, 4.10; tyrosin, 1.46; arginin, 0.20; histidin, 1.88; and lysin, 0.76. The prolamin consequently resembles that of oats more closely than those of other grains.—*Joseph S. Caldwell.*

5962. MIYAKE, KOJI, AND S. SŌMA. Further studies of the nature of nitrification. *Jour. Biochem. Tokyo* 1: 123-129. 1922.—K. Miyake has previously presented evidence (On the Nature of Ammonification and Nitrification. *Soil Sci.* 2: 481-492. 1916, and Further Studies of the Nature of Ammonification. *Ibid.* 4: 321-325. 1917) that the processes of ammonification and nitrification in soils are autocatalytic monomolecular reactions and that the increase of ammonia and nitric acid can be expressed by formulae. The present study reports results of experiments on nitrification of ammonium sulphate in air-dry soil kept at a moisture content equal to 6 per cent of its water-holding capacity in a 30°C. incubator. Nitric nitrogen and ammonia nitrogen were determined at 3-day intervals over a 35-day period. The results for increase of nitric acid agree closely with those calculated from the formula $\log x - \log (A - x) = K(t - t_1)$, in which x is the amount of nitrogen as nitric acid produced in the time t ; A , the total amount produced in the process; and t_1 , the time in which half the total amount is produced. The decrease of ammonia nitrogen is also expressed by the formula $\frac{\log (A - x)}{\log (x - a)}$ $= (A - a)Kt - K$, in which x is the amount of nitrogen in the form of ammonia at the end of time t ; A and a , the original and the final amount of ammonia; and K and K_1 , constants. The process of diminution of ammonia compounds in soils is an autocatalytic chemical reaction.—*Joseph S. Caldwell.*

5963. SASAKI, TAKAOKI. Über die Bildung der Anthranilsäure aus l-Tryptophan durch Subtilisbakterien. [Formation of anthranilic acid from l-tryptophan by *Bacillus subtilis*.] *Jour. Biochem. Tokyo* 2: 251-254. 1923.—In earlier work [Sasaki, T., and I. Otsuka, *Biochem. Zeitschr.* 121: 167-170. 1921] it was found that *Bacillus proteus* could convert l-tryptophane into l-indol-lactic acid. Employing similar cultural methods with cultures of *Bacillus subtilis* allowed to grow for 40 days in a medium containing 2 gm. l-tryptophane, anthranilic acid, the optical antipode of indol-lactic acid, was formed in sufficient quantity (0.63 gm.) to permit of its identification by determinations of melting point and elementary composition. Its isolation from the end products was accomplished by distillation of the contents of the culture flask after adding alcohol, taking up the residue with water, acidifying the filtrate with phosphoric acid, shaking out with ether, separating the acid constituents from the ether extract by shaking out with $\frac{7}{8}$ NaOH, neutralizing with H_2SO_4 , filtering with charcoal, and adding saturated $CuSO_4$ solution to the filtrate. The precipitate was washed with water, the copper removed with H_2S , and the solution extracted with ether in a Kumagawa-Suto extraction apparatus. Anthranilic acid crystallized out of the ether extract as it was evaporated down. The filtrate from the precipitate with $CuSO_4$ contained a trace of a substance precipitable by basic copper acetate, but the amount was too small to permit identification.—*Joseph S. Caldwell.*

5964. YOSHIMURA, KIYOHISA. Beiträge zur Kenntnis der stickstoffhaltigen Bestandteile der Chayote (Hayato-uri). [The nitrogenous constituents of Chayote.] *Jour. Biochem. Tokyo* 1: 347-351. 1922.—The fresh fruit of the Chayote (*Sechium edule*) contained 4.027 per cent of dry substance. The dry substance contained 2.602 per cent nitrogen, of which 59.99 per cent was protein nitrogen. 20 kgm. of fresh fruit yielded traces of adenin and cholin, 0.7 gm. arginin, and about 0.5 gm. guanidin.—*Joseph S. Caldwell.*

METABOLISM (ENZYMES, FERMENTATION)

5965. AVERSENQ, J. P., L. JALOUSTRE, ET E. MAURIN. Sur quelques actions du thorium X sur les diastases et les microbes. [Certain effects of thorium X on diastase and microbes.] *Compt. Rend. Acad. Sci. Paris* 176: 193-195. 1923.—A report is given of the effect of this material on the action of ptyalin, pancreatic amylase, amylase of germinating rice, emulsin,

ammoniacal fermentation, oxydase of the blood, oxidising ferments of saliva, and certain bacteria. In general it is found that thorium X activates these processes of hydrolysis and oxidation.—*C. H. Farr.*

5966. BRIDEL, MARC. *Action de l'emulsine des amandes sur le lactose en solution dans alcool ethylique a 85°.* [Action of almond emulsin upon lactose in 85 per cent ethyl alcohol.] Bull. Soc. Chim. Biol. 3: 533-538. 1921.—Emulsin was allowed to act for 25-70 days at room temperature, or at 40°C., upon a dilute solution of alcohol. The action ceased when 50 per cent of the lactose had been combined. B-ethylgalactoside and galactose were crystallized out of the products of the reaction and identified by their optical rotation and crystalline form. The lactose present in emulsin is therefore able to act in the presence of 85 per cent ethyl alcohol. The reaction is complex and it could not be determined, under the conditions of the experiment, whether lactose is first split into galactose and dextrose and these respectively combined with ethyl alcohol by galactosidase and glucosidase to form ethylgalactoside and b-ethylglucoside, or whether ethyllactoside is first formed and subsequently hydrolysed to form these 2 products.—*Joseph S. Caldwell.*

5967. BRIDEL, MARC. *Action de l'emulsine sur le galactose en solution dans des alcools propyliques de differents titres.* [Action of emulsin upon galactose in solution in various concentrations of propyl alcohol.] Bull. Soc. Chim. Biol. 3: 498-506. 1921.—Bourquelot and Hérissé established the fact that emulsin from almonds synthesizes b-propylgalactoside when allowed to act at room temperature upon an aqueous solution containing 1 per cent galactose and 20 per cent propyl alcohol. Bridel employed constant quantities of galactose and emulsin in varying concentrations of propyl alcohol, allowing the action to continue 113 days at 30°C., and found that there was little synthesis in the lower concentrations, the amount increasing with increase in concentration up to 45 per cent, where it was less than at 35, then increasing again up to 75 per cent. The enzyme rather rapidly loses its activity when kept in propyl alcohol of less than 45 per cent strength at 30°C., but maintains its activity in alcohol of higher concentrations. At ordinary temperatures activity is little affected whatever may be the strength of alcohol employed, but the synthesis goes on so slowly that the attainment of equilibrium may require months or years.—*Joseph S. Caldwell.*

5968. GORIS, A., ET P. COSTY. *Sur l'urease des Champignons.* [On the urease of fungi.] Compt. Rend. Acad. Sci. Paris 176: 412-414. 1923.—Urease, the hydrolysing ferment of urea, is obtainable from bacteria, fungi, and certain families of phanerogams, the legumes in particular. It is here studied from *Boletus edulis*. It is destroyed at 76°C., and has an optimum temperature of 30-38°C. A study is made of the effects of various inorganic and organic acids, also alkalies, neutral salts, and antiseptics.—*C. H. Farr.*

5969. GRAZEWSKA, MME. Z. *L'action des diastases sur la Laminarine.* [Action of enzyme upon laminarin.] Bull. Soc. Chim. Biol. 3: 490-497. 1921.—The polysaccharid laminarin was obtained from *Laminaria flexicaulis* by repeatedly extracting the dried, pulverized material with boiling water, removing mucilaginous impurities with mercuric nitrate, filtering, removing mercury with H₂S, concentrating, and precipitating with alcohol. Aqueous solutions do not reduce Fehling's solution and are not precipitated by lead acetate or subacetate, though the latter precipitates in ammoniacal solution. Under certain conditions of temperature and concentration, aqueous solutions precipitate spontaneously. Hydrolysis for $\frac{1}{2}$ hour at 120° with 5-6 per cent HCl yielded dextrose equalling 97.5-98.5 per cent of the laminarin used. Pancreatic juice and gastric juice of the dog, as well as a preparation of invertase made from the intestinal mucosa of the dog, and emulsin were without action upon laminarin. Vegetable amylase and invertase in slightly acid solution converted it into dextrose rather slowly, a mixture of equal parts of the 2 acting twice as rapidly as an equivalent amount of either separately. Taka-diastrase was somewhat more active, and an extract of *Helix pomatia* still more so. No trace of maltose was found in the products of digestion.—*Joseph S. Caldwell.*

5970. HARTER, L. L., AND J. L. WEIMER. Amylase in the spores of *Rhizopus Tritici* and *Rhizopus nigricans*. Amer. Jour. Bot. 10: 89-92. 1923.—An enzyme (amylase) capable of hydrolyzing potato starch paste is produced in the spores of these 2 species. Results indicate that the enzyme is produced in the spores regardless of the temperature at which they are grown, nor does the amount of enzyme seem to be correlated with the temperature to which the organism has been subjected. The enzyme produced by the mycelium has a higher hydrolyzing power than that in the spores.—E. W. Sinnott.

5971. MCGUIRE, GRACE, AND K. GEORGE FALK. Studies on enzyme action XXIII. The spontaneous increase in sucrose activity of banana extracts. Jour. Amer. Chem. Soc. 45: 1539-1552. 1923.—During a study of banana sucrose, conditions arose where its action showed a spontaneous increase of considerable magnitude. The state of ripeness proved to be one factor. Also, this increase was more rapid at higher temperatures. The solutions used for the extraction were not a factor nor was the H-ion concentration a factor in increasing the hydrolysis.—J. M. Brannon.

5972. MAYEDA, MINORU. Preliminary communication on mannanase and laevidulinase. Jour. Biochem. Tokyo 1: 131-137. 1922.—Cultures of 17 saprophytic bacteria were tested as to their ability to liquefy Konjak-mannan (prepared from *Amorphophallus Konjaku*, extensively used in the Japanese dietary). Four forms, *B. mesentericus vulgatus*, *B. mesentericus fuscus*, *B. mesentericus flavus*, and *B. leptosporus*, were able to liquefy mannan but no mannose was formed. The product of bacterial action is a trisaccharid which is hydrolyzed by mineral acids to mannose and glucose, and which the author names laevidulin. Fifteen species of fungi including *Penicillium glaucum*, *Verticillium glaucum*, *Monilia candida*, *M. javonica*, *Charla mycoderma*, and 10 species of *Aspergillus*, were tested as to their action upon Konjak. Nine of these—*Penicillium glaucum* and 8 species of *Aspergillus*—were able to liquefy mannan, but no mannose was formed. When cultures of these forms were dried, ground, and added to a medium containing either Konjak or laevidulin, mannose formation occurred, especially in the case of *Aspergillus niger* and *A. albus*. There are consequently 2 enzymes concerned in the process, a mannan-liquefying enzyme, mannanase, which forms laevidulin, and an enzyme which splits laevidulin to mannose, for which the name laevidulinase is proposed. Of various commercial diastase preparations examined, "digestin" and "enddiastase," both made from plant materials, contain both enzymes, while diastases of animal origin do not contain laevidulin. The mannan-liquefying enzyme diffuses through a collodion capsule, laevidulinase does not.—Joseph S. Caldwell.

5973. MIYAKE, KOJI, AND MITSUJI ITO. On lethal temperature of Koji-diastase in aqueous solution and the recovery of its action after heating. Jour. Biochem. Tokyo 2: 255-270. 1923.—An aqueous extract of Koji (polished rice infected by *Aspergillus Oryzae*) containing 1.0115 per cent solids was used. Portions of this were heated for various periods up to 120 minutes at temperatures from 25 to 145°C. and were then tested for power to saccharify soluble starch, the digestion continued 100 hours at 38°C. under toluene. The amount of sugar formed was determined after 1, 5, 15, 25, 50, and 100 hours. Heating to 40°C. for 2 hours, or to 55, 70, 85, or 100°C. for periods ranging from a few seconds to 1 hour decreased but did not wholly prevent diastatic activity. The diminution in activity became greater with increase in temperature, and in the case of any particular temperature it was roughly proportional to the time the heating was continued. A solution heated to 115°C. for 15 minutes or less retained some saccharifying power, but was inert when the time of heating was 30-60 minutes; one heated to 130 or 137.5°C. for "an instant" still showed traces of activity but was inert if the heating was continued 5 minutes or more. Even momentary heating to 140°C. or higher completely destroyed activity. The degree of injury is consequently a function of temperature and time of heating. In the study of recovery of activity after heating, various portions of the solution were heated to differing temperatures for various time intervals, cooled, and kept under toluene at room temperature for periods of 25-480 hours prior to testing. The activity of each of these was checked against a portion of the solution heated to the same temperature for the same time

immediately before the test. In every case in which the temperature and time of heating were insufficient to wholly destroy diastatic activity, the activity gradually increased after the solution had been allowed to stand in an amount proportional to the time allowed to elapse, but the recovery was in every case very imperfect. If the temperature and time of heating were such as to totally destroy activity, there was no recovery. Whether recovery is due to the formation of new enzyme from a mother substance present in the extract or to a true recovery of diastatic action after temporary loss cannot be definitely determined from these experiments, though the authors favor the assumption that it is a true recovery.—*Joseph S. Caldwell.*

5974. THOMAS, ARTHUR W., AND F. L. SEYMOUR-JONES. The hydrolysis of collagen by trypsin. *Jour. Amer. Chem. Soc.* 45: 1515-1522. 1923.—It is commonly stated that trypsin does not attack collagen unless it has been pre-treated with acids or alkalis, or shrunk in water at 70°C., or treated with pepsin. The authors found that trypsin attacked collagen. The optimum reaction is pH 5.9. A pre-treatment with acid does not affect the tryptic digestion. The rate of hydrolysis increases with a decrease in the size of the collagen particles and an increase in the concentration of the enzyme.—*J. M. Brannon.*

METABOLISM (RESPIRATION, AERATION)

5975. CHRISTIANSEN, M. En simpel methode til Dyrkning af anaerobe Bakterier under Pyrogallol. [A simple method for growing anaerobes under pyrogallol.] *K. Vet. og Landbohøjskoles Aarsskr.* 1923: 52-61. *Fig. 1-2.* 1923.—Common agar or bouillon tubes, or even culture media in 250 cc. flasks, are boiled, then the cotton plugs are flamed and pushed a little downwards in the tubes. Absorbent cotton wet with pyrogallol is placed in a short tube connected with the culture tube by means of a rubber tube 25 mm. long. When the tubes are without rims the application is easy if the rubber tubing is wetted. By this method the culture glass is kept free from pyrogallol, the tube may be opened, and the pyrogallol may be renewed.—*Ernst Gram.*

5976. MAQUENNE, L. A propos d'une Communication récente de MM. P. A. Dangeard et Pierre Dangeard. [Concerning a communication of Messrs P. A. and Pierre Dangeard.] *Compt. Rend. Acad. Sci. Paris* 176: 205-207. 1923.—This paper contains a statement of appreciation of the contribution made by the authors named in their paper [see *Bot. Absts.* 12, Entry 5922]. The physiological significance of the discovery is discussed. It is pointed out that it is possible only if the respiratory quotient is at least equal to 1. It is stated that the relationship between photosynthesis and respiration in this connection is yet to be studied.—*C. H. Farr.*

5977. POPOFF, METHODIE. Sur le système respiratoire des plantes. [The respiratory system of plants.] *Compt. Rend. Acad. Sci. Paris* 176: 594-596. 1923.—It is generally recognized that the leaf is well adapted for respiration, since the diffusion of oxygen may take place from the external air and also from the intercellular spaces as a result of the process of photosynthesis. The mechanism affording aeration of the stem and roots, especially of trees, seems to be quite insufficient. The difficulty, however, disappears, if it is admitted that plants have a respiratory system analogous physiologically to that of animals. The salts of Mg, Mn, K, Ca, and Fe are found in the blood serum of animals, even of the invertebrates which have no blood corpuscles or haemoglobin. These same minerals circulate in the vessels of plants. The roots of plants take in $MgSO_4$, KCl , KNO_3 , $NaCl$, $CaSO_4$, $CaH_4(PO_4)_2$, $Fe_3(PO_4)_2$, etc., in solution. The oxygen absorbed in this solution is transported to the roots, trunk, and branches of the plant. This circulation is assured by the incessant transpiration of the leaves. In turn the water of the stream is charged with CO_2 from the cells which take up the oxygen. This CO_2 is carried to the leaves and discharged or used in photosynthesis. In the leaves the water is again charged with oxygen and descends in the tubes of the phloem. The ascending and descending currents are connected by the medullary rays which correspond to the capillaries of animals.—*C. H. Farr.*

ORGANISM AS A WHOLE

5978. AMAR, JULES. *La loi du minimum en Biologie.* [The law of the minimum in biology.] *Compt. Rend. Acad. Sci. Paris* 176: 466-468. 1923.

5979. GARNER, W. W., AND H. A. ALLARD. Further studies in photoperiodism, the response of the plant to relative length of day and night. *Jour. Agric. Res.* 23: 871-920. *Pl.* 1-19. 1923. —Trials with many kinds of plants, in addition to those previously studied [see *Bot. Absts.* 5, Entry 22], demonstrate the importance of the seasonal range of length of day as a factor in initiating and regulating both sexual and asexual reproduction in plants. Observations are reported on length of day as a factor in the character and extent of branching, in root growth, in pigment formation, in abscission and leaf fall, in dormancy, and in rejuvenescence. Apogeotropic growth—increase in stature as affected by the daily light period—is given detailed consideration in its apparent relation to flowering, fruiting, and the other responses mentioned. —From the more general aspects of the problem it appears that the degree of hydration of the living cell is subject to very delicate regulation by change in the ratio of the number of hours of light to the number of hours of darkness. Regardless of its actual causative significance, hydration is subject to definite regulation by length of day, and change in the degree of hydration is definitely correlated with change in form of expression in the plant.—*D. Reddick.*

5980. JORDAN, EDWIN O., AND J. C. GEIGER. Two "food poisoning" outbreaks apparently due to bacilli of the paratyphoid enteritidis group. *Jour. Infect. Diseases* 32: 471-478. 1923. —Poisoning, supposedly from contaminated food, was believed to have been caused by *B. paratyphosus A* in one instance and *B. paratyphosus B* in another. Previous inoculation with vaccine containing the typhoid bacillus and strains of paratyphoid bacilli failed to confer any protection on the individuals.—*R. L. Starkey.*

5981. SANTOLYNE, P. Les cultures pures de ferments sélectionnés pour améliorer les qualités du beurre et des fromages. [Pure cultures of selected ferments for improving the quality of butter and cheese.] *Nat. Canadien* 49: 61-63. 1922.—This is a popular introduction to the scientific developments of today.—*A. H. MacKay.*

5982. SCHEUNERT, A., UND M. SCHIEBLICH. Ueber die bei der elektrischen Futterkonservierung ablaufenden Vorgänge. [The sequence of events during the electrical treatment of fodder.] *Illus. Landw. Zeitg.* 43: 57-58. 1923.—The effects on the bacterial flora are discussed. By raising the temperature the electric current causes an increase in the number of desirable species of bacteria, notably the lactic acid-producing forms, and a decrease in the undesirable species. The final result is a fodder which is practically sterile. A list of bacteria is given including the relative numbers of these at different stages in the treatment, likewise a list which is considered an "obligate Konservierungsflora."—*John W. Roberts.*

5983. YAMAGATA, U., AND J. K. WILSON. Reaction of medium and growth of *Azotobacter*. [Abstract.] *Absts. Bact.* 7: 85. 1923.

GROWTH, DEVELOPMENT, REPRODUCTION

5984. CREMIEU, V. La croissance de végétaux et les principes de la physique. [The growth of plants in relation to physical principles.] *Compt. Rend. Acad. Sci. Paris* 176: 263-265. 1923.—This paper is a consideration of the work done in growth, in the lifting of the plant against gravity. It is calculated that 125 kgm. of oat seed planted on a hectare of ground, lift during their development into mature plants 1500 kgm. of seed and 3000 kgm. of straw to a height of 0.6 m. It is held that the growth of the stem is due to an action characteristic of the interior of the initial cells and independent of the weight of the cells. This action is discontinuous and is directed by the resultant of the field which controls the interior of the cell, without distinguishing between the field of gravity and the field of inertia. It is calculated

that the work done by a young stem of corn or onion per second is about 0.03 erg. The emission of segments of the meristem is compared to the emission of alpha rays from a radioactive atom, and it is said to correspond to a certain value of the turgescence of the cell.—*C. H. Farr.*

5985. HUNTER, C., AND E. M. RICH. Laboratory note. An apparatus for the measurement of stem elongation. *New Phytol.* 22: 44-47. 2 fig. 1923.—By the use of the spherometer with an electrical recording device, growth increments of 0.005 mm. were measured. The method is applicable to *Impatiens* and similar plants in which a leaf axil close to the growing point may be used to support the vertical glass tube employed in the apparatus.—*I. F. Lewis.*

5986. PRIESTLEY, J. H., AND J. EWING. Physiological studies in plant anatomy. VI. Etiolation. *New Phytol.* 22: 30-44. 1923.—If the environments of root and stem are reversed experimentally, little structural modification is seen in the root, but in the stem the great structural modifications known as etiolation appear. Of the various types of etiolation known, the common one shown by *Vicia Faba* and the potato are here considered. Under conditions normal to the root, the stem apex resembles in its development the root. The apical meristem remains relatively impermeable to nutrient sap. Meristematic tissue active in growth is found below the persistent "plumular hook." The rudiments of the lateral leaves and axillary branches therefore fail to develop further. Another consequence of the changed meristematic development is the production of a functional primary endodermis in the stem. To the presence of this endodermis may be attributed in part the reduced cortical development of the stem. Owing to the depression of transpiration extension goes on in an etiolated plant equally by day and night. The experiments cited do not support the hypothesis that elongated growth in etiolation is due to the absence of a growth inhibiting secretion formed by the chloroplasts in the light.—*I. F. Lewis.*

5987. PRIESTLEY, J. H., AND LETTICE M. WOFFENDEN. Physiological studies in plant anatomy. V. Causal factors in cork formation. *New Phytol.* 21: 252-268. 1922.—Experiments with *Begonia* show "that periderm formation involves two processes, first a suberization which seals the injured surface, secondly a meristem formation which follows upon the accumulation of sap at the injured surface." The effect of sap pressure in the formation of meristem is shown by the behavior of cut leaves of *Prunus Laurocerasus* and *Camellia japonica* when supplied with water under a pressure of about 10 cm. of mercury. In this case meristem formed around the cut in less than 2 weeks, while in similar leaves standing in water there was no meristem formation. The preliminary suberization that usually blocks a parenchymatous surface prior to the formation of phellogen is shown to depend primarily upon air. These considerations apply not only to wound cork formation, but also to the scar left at leaf fall and to natural cork formation. They also serve to explain certain "special cases, such as the general absence of periderm formation in the cortex of roots, in the axes of aquatic plants, and in leptosporangiate ferns."—*I. F. Lewis.*

5988. REED, ERNEST. Hypothesis of formative stuffs as applied to *Bryophyllum calycinum*. *Bot. Gaz.* 75: 113-142. Fig. 1-10. 1923.—A summary of previous work on growth correlation is given. The author presents a series of 10 experiments, 2 of which will be given here. An experiment yielding evidence against the "inhibiting factor" theory is as follows: A leaf removed from the plant and thereby cut off from the influence of any inhibiting force, when placed in an upright position in moist sand, did not in 6 months produce any plantlets from the notches. In another experiment portions of several leaves were placed in contact with moist sand, and those notches which were in contact with the substratum were the ones which produced plantlets, no evidence being found to substantiate Loeb's theory of an "available formative stuff" as the controlling factor. From all of his experiments the author deduces the following: "The growth of the foliar shoots in *B. calycinum* is possible only from the performed buds in the notches of the leaf. When these *Bryophyllum* plants are growing under normal conditions the buds in the leaves lie dormant. There are no indications that this dormancy is due to the fact that these units are deprived of formative stuffs or specific substances, the avail-

ability of which would cause their germination. The plant or any organ of the plant does not exert an inhibiting influence over these meristematic units. The dormancy or the germination of these units is an expression of the metabolic condition of the organ of which they are a part. The germination of these units is probably due to physical and chemical changes within the organ of which they are a part. Any factor or group of factors working together which set up this series of changes are indirectly responsible for the growth of the foliar plantlets or those from the axillary buds. One of the conditions which starts the growth from the meristematic units of the leaf is very moist air or water in contact with the leaf. The absence of light also brings about a condition which starts this growth."—*B. W. Wells.*

5989. REED, H. S. A note on the statics [statistics] of cyclic growth. *Proc. Nation. Acad. Sci. [U. S.]* 9: 65-67. 1 fig. 1923.—During their 1st season's growth, 79 apricot branches reached a mean length of 235.95 cm. and produced lateral shoots averaging 37 in number and about 7 times the length of the main branch in total length. The lateral shoots were typically produced in 3 groups, in which number and size of lateral decreased distally along the main axis. The numerical relations were closely approximated by 3 overlapping curves derived from the differential equation of growth, $Z = dy/dx = ky (A - y)$. It is concluded that the length of each lateral and the size of each group is a function of position on the main branch, and that the decreasing size of cycles suggests clamped oscillations.—*Howard B. Frost.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

5990. CHOLODNYJ, N. Über den Einfluss der Metalle auf den Geotropismus der Wurzeln. [The influence of metals on the geotropism of roots.] *Beih. Bot. Centralbl. I Abt.* 39: 239-256. 1923.—The experiments show that the ions of alkali metals and alkaline earths influence considerably the bendings of roots. It is highly probable that these ions play an important part in the mechanism of the geotropic reaction.—*L. Pace.*

5991. SAXTON, W. T. Autonomous movements in *Eleiotis sororia* DC. *Jour. Indian Bot.* 3: 72-78. 2 fig. 1922.—The lateral leaflets of *Eleiotis sororia*, a plant of northern Bombay Presidency, exhibit movements similar to those of *Desmodium gyrans*. The tip of a leaflet describes an "ellipse," the long axis of which is an arc of about 140°. The period of revolution is about 2 minutes. Synchronously with its other movements the leaflet rotates about 45° on its own axis. Movement parallel to the petiole and rotation of the leaflet on its own axis are brought about by the distal end of the petiolule, while rotational movement about the petiole is due to curvature at the proximal end of the petiolule.—*Winfield Dudgeon.*

5992. SAXTON, W. T. Some observations and suggestions regarding "nyctinasty." *Jour. Indian Bot.* 3: 127-142. 1 pl. 1923.—The author describes observations on "sleep" movements of 31 plants (4 Euphorbiaceae, 23 Leguminosae, *Abutilon indicum* Sweet, *Triumfetta rhomboidea* Jacq., *Thespesia populnea* Soland, and *Achyranthes aspera* L.), all but 1 of which are found abundantly at Ahmedabad, India. Characteristic "sleep" positions of the leaves are described and figured. Most of them are referable to one or another of Kerner's 3 types. In a few plants the movements from day to night position and back are described in detail. In the majority of cases folding and unfolding require about 40-45 minutes each for completion, and are carried out while the sun is up.—After dismissing earlier theories, which seem to assume that the expanded or day position is the normal one, the author proposes the theory that "the night and not the day position is that 'normal' to plants, and that therefore there is no such thing as 'nyctinasty.'" The movement so-called is merely the return of the plant to its normal position after the stimulus is withdrawn which keeps it during the day in another position, regarded here as one of physiological strain. Those plants in which such movements are not seen either have a normal position suited to their daylight requirements, or have not sufficient 'elasticity' to return to the normal position after once departing from it."—*Winfield Dudgeon.*

GERMINATION, RENEWAL OF ACTIVITY

5993. BLOMQUIST, H. L. Dormancy in seed of persimmon (*Diospyros virginiana*). Jour. Elisha Mitchell Sci. Soc. 38: 14. 1922.—The seed have normally a resting period not definitely determined, but apparently lasting from 2 to several years. This was found to be due mainly to a layer of the seed covering which caps the radicle and decreases water absorption. When this cap was removed, 100 per cent germination was secured.—W. C. Coker.

5994. BRANDTS, P. De kieming der zaden. [Germination of seed.] Natuurw. Tijdschr. 4: 233-234. 1922.—“Germination” is usually considered as the emergence of the tip of the root. The writer, however, takes the view that germination takes place when the 1st new divisions occur in the formative region of the root.—J. C. Th. Uphof.

5995. HARRINGTON, GEORGE T. Use of alternating temperatures in the germination of seeds. Jour. Agric. Res. 23: 295-332. 20 fig. 1923.—Seeds of carrot (*Daucus carota*), parsley (*Petroselinum hortense*), timothy (*Phleum pratense*), awnless brome grass (*Bromus inermis*), *Lolium perenne*, *L. multiflorum*, *Festuca elatior*, *Impatiens balsamina*, *Eschscholzia californica*, *Iberis amara*, *Cosmos bipinnatus*, *Kochia scoparia*, *Delphinium ajacis*, *Calendula officinalis*, *Reseda odorata*, *Tropaeolum majus*, *T. inermis*, *Viola tricolor*, *Petunia hybrida*, *Dianthus chinensis*, *Papaver* spp., *Portulaca grandiflora splendens*, *Antirrhinum majus*, *Lathyrus odoratus*, and *Zinnia elegans* germinate nearly or quite as rapidly and completely at favorable constant temperatures as with any alteration of temperatures.—Seeds of *Agrostis palustris*, *Dactylis glomerata*, *Poa pratensis*, *Capriola dactylon*, *Pastinaca sativa*, *Celeri graveolens*, and *Holcus halepensis* require an alteration of temperatures for best germination.—A study of temperature changes in incubators leads to the conclusion that for testing seeds that require alternation of temperatures it is better to use 2 incubators and move the seeds than to depend upon changing the temperature in a single incubator.—D. Reddick.

5996. MUTTERLEIN. Kartoffel-Keimversuche. [Experiments in the sprouting of potatoes.] Illus. Landw. Zeitg. 43: 102-103. 1923.—Experiments are given demonstrating the effects of darkness, temperature, moisture, and cutting on the sprouting of potato tubers.—John W. Roberts.

5997. SEMPERS, J. FORD. Vitality of canna seeds. Amer. Bot. 29: 57-60. 1923.—A few observations were made on the durability of seed coats, especially those of canna.—S. P. Nichols.

TEMPERATURE RELATIONS

5998. BURKE, GEORGINA S. Studies on the thermal death time of spores of *Clostridium botulinum*. 2. The differential staining of living and dead spores. Jour. Infect. Diseases 32: 433-438. Fig. 1. 1923.—Heat increased the permeability of spores of *Clostridium botulinum* to carbol-fuchsin; dead spores stained solid while living spores did not. The amount of heat necessary to bring about the change in permeability varied with the individual spores. The differential penetration of the dye into living and dead spores suggested a rapid method of determining their proportional abundance in cultures.—R. L. Starkey.

TOXIC AGENTS

5999. CHOLODNYJ, N. Zur Frage über die Beeinflussung des Protoplasmas durch mono- und bivalente Metallionen. [The influence of mono- and bivalent metal ions on protoplasm.] Beih. Bot. Centralbl. Abt. 39: 231-238. 1923.—The root hairs of *Trianea bogotensis* were used because of their large size and rich plasma content and the movement of the cytoplasm. KCl, CaCl₂, BaCl₂, NaCl, MgSO₄, LiCl, and MnCl₂ were used.—The author concludes that the ions of all alkali metals possess a more or less positive toxicity which is evident in changes in the consistency of the protoplasm, in the slowing and even complete stopping of plasma movement with, finally, the death of the protoplasm. The toxicity of these substances is not identical.

K and NH_4 salts are more toxic than Na salts. The ions of the alkaline earths and of other bivalent metals are also poisonous, with the possible exception of Ca. But they furnish a more or less evident protection against injury from the monovalent ions of metals.—*L. Pace.*

6000. JANKE, ALEXANDER. *Die Bekämpfung der Kahl Organismen und ihre Bedeutung für die Konservenindustrie.* [The control of the zooglea-forming organisms and their relation to the canning industry.] *Centralbl. Bakt. II Abt.* 56: 1-7. 1922.—The use of allyl-mustard oil proved very effective in controlling the zooglea-forming organisms, which are very often destructive to acid preserves such as tomatoes, sour kraut, etc.—*Anthony Berg.*

6001. KUSONOKI, MICHIO. *On the bactericidal action of hydrosol of silver.* *Jour. Biochem. Tokyo* 1: 381-388. 1922.—*Bacillus coli communis* was employed as the test organism. The dialysates obtained by dialyzing silver sols against distilled water in contact with air or O_2 had high bactericidal power which was abolished by addition of traces of NaCl, thus indicating that the silver ion is the active agent. Dialysates made in an atmosphere of H_2 or CO_2 had practically no bactericidal properties. The author considers that in O_2 or air the silver hydrosol oxidizes to silver oxide, which dissociates, giving the silver ion as the active agent. In the air, silver carbonate, which dissociates more easily than the oxide, is formed by reaction with CO_2 . Bactericidal activity is almost independent of the concentration of the colloidal silver hydrosol provided that there is free access of air, so as to permit the setting free of the silver ion.—*Joseph S. Caldwell.*

6002. MORI, GENSICHI. *A preliminary note on the inhibitory action of the salts of silver and some other heavy metals on amylase.* *Jour. Biochem. Tokyo* 2: 117-129. 1922.—Silver as the nitrate, chloride, and bromide, gold chloride as sodium chloraurate, copper sulphate, and lead acetate were studied as to their inhibitory effect upon formation of maltose from soluble starch by malt diastase. The results do not agree with the conclusion of U. Olsson (*Hoppe-Seyler's Zeitschr. Physiol. Chem.* 114: 51-71. 1921) that the decrease of amylolytic activity is directly proportional to the amount of silver salt added. Working with concentrations of 6×10^{-8} mol or less, the inhibitory action is a constant function of the concentration of the metal; with higher concentrations there is no agreement. The results indicate that there may be a well defined relation between concentration of enzyme and concentration of salt. When the amount of added silver salt is large, the action of the enzyme is directly proportional to the square of the amount of enzyme solution in cc. and inversely proportional to the square of the amount of salt solution in cc. An equation is developed to represent the relation between the concentration of enzyme and metal and the degree of inhibition which agrees fairly well for the experimental data presented for the metals studied. This equation is based upon the assumption that metals depress enzymic activity by formation of a definite metal-enzyme compound. The fact that the activity of a diastase preparation inactivated by AgNO_3 can be restored by addition of H_2S is regarded as bearing out this assumption. The strengths of inhibitory action of silver, gold, copper, and lead stand in the ratio of $1 : \frac{1}{18} : \frac{1}{30} : \frac{1}{1400}$.—*Joseph S. Caldwell.*

6003. NICOLAS, E., ET G. NICOLAS. *L'influence de l'hexaméthylènetétramine et de l'aldéhyde formique sur la morphologie interne et sur le chimisme du haricot.* [The influence of hexamethylenetetramine and of formaldehyde on the internal structure and chemical composition of beans.] *Compt. Rend. Acad. Sci. Paris* 176: 404-407. 1923.—Recently the authors have shown [see *Bot. Absts.* 12, Entries 4595, 4596] that hexamethylenetetramine and formaldehyde added in small amounts to Knop's nutrient media are used as food by beans. The present study is undertaken to find whether these substances have an anatomical effect. A concentration of 0.01-0.025 per cent of hexamethylenetetramine clearly favors the development of secondary wood, which is more abundant and more lignified, as indicated by treatment with phloroglucine, in the treated than in the control. Cells of the pericycle are more differentiated, with walls thicker than in controls. A concentration of 0.05 per cent which is still not toxic, also increases the development of wood and the differentiation of the pericycle, but not to so

marked a degree as in the lower concentrations. A higher concentration induces an abundant growth of epidermal hairs. The lower concentrations favor the deposition of starch in the stem at the periphery of the pith, while a concentration of 0.0321 per cent facilitates the deposition of starch in the root. It is concluded that these results favor the formaldehyde theory of photosynthesis.—C. H. Farr.

6004. VILLEDIEU, G., ET MME. [G. VILLEDIEU]. Action des oxydes insolubles sur le mildiou de la pomme de terre (*Phytophthora infestans*). [The effect of insoluble oxides on *Phytophthora infestans*.] Compt. Rend. Acad. Sci. Paris 176: 534-536. 1923.—It has previously been shown by the authors [see Bot. Absts. 9, Entry 529] that *Penicillium* and *Mucor* are prevented from growing by certain substances, such as the oxides of copper and cadmium, which are practically insoluble. It is now undertaken to study the germination of the conidia of *Phytophthora infestans* in the same way. Drop cultures were observed continuously under the microscope. The solution was prepared by leaving an excess of the oxide in doubly distilled water for 24 hours, and then filtering. Three types of cultures were employed: in 1 this filtrate was used; in the 2nd there was added to the filtrate a little of the solid oxide; and in the 3rd a long drop was made in 1 end of which some of the solid oxide was placed. Conidia were sown throughout each drop. In the 1st case the conidia form active zoospores, which in turn germinate. In the 2nd nothing developed, or, if a zoospore did escape, it immediately died without germinating. In the last case the zoospores were formed and developed normally in the end of the drop in which there was no precipitate, but in the end in which the oxide was placed, nothing remained alive. The oxides used were red oxide of mercury, black oxide of copper, zinc oxide, cobalt oxide, cadmium oxide, and magnesium oxide—which becomes the hydrate in water. It is concluded that the toxicity is due to the basic nature of the oxides, for if the oxides are neutralized with acids the mildew develops. It also develops in solutions of Bi_2O_3 , Fe_2O_3 , Al_2O_3 , Cr_2O_3 , Pb_2O_4 , MnO_2 .—C. H. Farr.

MISCELLANEOUS

6005. BRAMBILA, MIGUEL. Estudio fisico-quimico del aceite de chicalote. [Physical and chemical studies of the oil of the Mexican poppy.] Rev. Agric. [Mexico] 7: 236-238. 2 fig. 1922.—Methods of refining the oil from the seed of the Mexican poppy (*Argemone mexicana*) are given together with the physical and chemical properties of the oil.—John A. Stevenson.

6006. SCHEUNERT. Zur Frage der Verwendung der Kohlensäure bei der Grünfütter-Konservierung. [The use of CO_2 in the preservation of green fodder.] Illus. Landw. Zeitg. 42: 229-230. 1922.—In experiments conducted by the writer, CO_2 failed to prevent spoilage of green fodder.—John W. Roberts.

6007. TROLAND, L. T. The present status of visual science. Bull. Nation. [U. S.] Res. Council 5: part 2, No. 27. 120 p. December, 1922.—The object of this monograph is neither to present new data nor to summarize old work, but rather to analyze the aims, methods, and general nature of the phenomena of vision from the points of view of physics, physiology, and psychology. Practically every phase of vision is covered, ranging from the nature of light, through the dioptric and retinal mechanisms, to the perception of time and space in the visual field. A good bibliography is appended giving a chosen set of leading articles and books, from which the reader may begin the study of any portion of this enormous field.—Selig Hecht.

SOIL SCIENCE

A. G. McCALL, Editor

(See also in this issue Entries 5297, 5298, 5301, 5304, 5306, 5312, 5313, 5319, 5331, 5341, 5342, 5343, 5345, 5346, 5347, 5348, 5351, 5352, 5359, 5361, 5366, 5375, 5378, 5410, 5455, 5475, 5478, 5542, 5643, 5709, 5801, 5803, 5841, 5921, 5930, 5935, 5938, 5962, 5983)

6008. ANONYMOUS. Weeds steal soil moisture. Associated Grower 5*: 7. 1923.—The author quotes Thomas F. Hunt's statement concerning the work of F. J. Veihmeyer and A. H. Hendrickson on soil moisture conservation in California. Their experiments show that

no significant saving of moisture results from cultivation of the soil, provided all weed growth is kept down by surface hoeing. Cultivation on the farm is essential, however, as the only practical means of controlling weed growth. The experiments in California are confirmed by field experiments in Kansas.—*E. L. Overholser.*

6009. CHARDÓN, CARLOS E. *Estudio preliminar sobre la amonificación y nitrificación de los terrenos de Puerto Rico.* [Preliminary studies on the ammonification and nitrification in Porto Rican soils.] *Rev. Agric. Puerto Rico* 61: 37-46. 1921.—The author, from a series of laboratory experiments, concludes that the addition of lime to the typical heavy red soil of Porto Rico is desirable since it aids in nitrification. This holds true whether or not organic nitrogenous fertilizers are applied.—*John A. Stevenson.*

6010. CHRISTENSEN, H. R. *Den kemiske Jordbundsanalyse.* [Chemical soil analysis.] *Ugeskr. Landm.* 67: 393-396. 1923.—This is a review of a lecture by K. A. VESTERBERG printed in *Internat. Mitt. Bodenkunde* for 1922.—Attempts to determine nutritive materials for plants by chemical analysis of the soils have hitherto been unsuccessful. Determinations of the minimum concentrations of phosphoric acid, nitrogen, and potassium required for normal plant development may be helpful. Investigations of drainage water and lysimeter experiments show that these concentrations, in mg. per l. of soil moisture are: 1-2 of P_2O_5 , 2-5 of N, and 10-20 of K_2O . When the amounts of these elements required by the different crops are determined, the power of the soil to produce and maintain the necessary concentrations during the growing season should be investigated.—*Ernst Gram.*

6011. CHRISTENSEN, H. R. *Havrens Forhold til Jordens Kalkindhold.* [The relation of oats to the lime content of the soil.] *Ugeskr. Landm.* 68: 81-82. 1923.—In Danish field experiments increasing amounts of lime increased the crop of oats, even up to an application of 48 tons of calcium carbonate per hectare, and to pH 7.2-7.5. If heavy applications of lime sometimes injure oats on certain heavy clays, the effect is indirect and of unknown nature.—*Ernst Gram.*

6012. CHRISTENSEN, H. R. *Humleagtig Sneglebælgs Forhold til Jordens Surhedsgrad.* [Relation of *Medicago lupulina* to soil acidity.] *Vort Landbrug* 42: 30. 1923.—The investigations of C. Olsen corroborate those of S. Joffe, according to which alfalfa may thrive at pH values considerably lower than 7. Even with a pH value of 5, an acidity seldom found in mineral soils in Denmark, some growth occurs, while an approximately maximal growth is reached at about pH 6.—*Ernst Gram.*

6013. CHRISTENSEN, H. R. *Humleagtig Sneglebælgs Forhold til Jordreaktionen.* [The relation of *Medicago lupulina* to soil reaction.] *Ugeskr. Landm.* 67: 612-614. 1922.—An investigation of 30 soil samples from 9 farms has shown that while the pH as a rule is high where black medic is vigorous, it may thrive well on soils where the pH goes down as far as 6.1 or even 5.8. The average pH of fields with a good crop was 6.7. Apparently the poor spots in the black medic fields are not always due to lack of lime.—*Ernst Gram.*

6014. FRAPS, G. S. *The fixation of phosphoric acid by the soil.* *Texas Agric. Exp. Sta. Bull.* 304. 22 p. 1922.—Higher temperatures increase fixation in some Texas soils, as did prolonged contact. Acid treatment which removed the lime carbonate had little effect on fixation in some soils and decreased it considerably in others. Igniting the soil increased its power to fix phosphoric acid even when the lime was previously removed by acid. A large part of the fixation took place below the mixture of soil and fertilizer. An examination of 761 surface soils and 651 subsoils showed that the percentages of iron and aluminium increase with the increase in the percentages of phosphoric acid fixed.—*L. Pace.*

6015. GODBOLE, S. V. *Some criticisms on Mason's method of determining directly the physiological humidity of the soil.* *Jour. Indian Bot. Soc.* 3: 174-177. 1923.—Mason's method [West Indian Bull. 19: March, 1922] consists in using the points of hard-leaded pencils ("Kohi-

noor" 6H) to absorb water from the soil for a definite period of time, and taking the weight of absorbed moisture as an index of the water-supplying power of the soil. The author finds the method unsatisfactory for the following reasons: (1) different pencils and different parts of the same pencil do not have the same absorbing power; (2) water is absorbed through the varnished sides as well as through the wood exposed at the point; (3) some moisture is lost before weighing unless great precaution is taken; (4) some soil adheres to the point; (5) air-dry pencils contain some moisture; and (6) the absorbing surface is too small.—*Winfield Dudgeon*.

6016. GREENSTREET, V. R. Report on the soils of Lubok Tamang and Cameron's Highlands. *Malayan Agric. Jour.* 10: 281-283. *Sketch map.* 1922.—These soils are of uniformly open texture with adequate content of organic matter and nitrogen; they show striking resemblance to the best tea and Cinchona soils of India and Java respectively and are suitable for market garden purposes. [See also Bot. Absts. 12, Entry 5464.]—*R. E. Holttum*.

6017. GREENSTREET, V. R. The composition of Kedah and Perlis phosphates. *Malayan Agric. Jour.* 11: 70-71. 1923.—These phosphates show great variation, and though a fairly high percentage of phosphorus may be present, in all samples but 1 (Perlis) the amount of iron and aluminium was so much in excess of the calcium as to make the phosphorus "unavailable."—*R. E. Holttum*.

6018. GREVE, M. Om Forholdet mellem Jordens Reaktion og Udviklingen af Humleagtig Sneglebælg. [On the relation between soil reaction and the development of *Medicago lupulina*.] *Ugeskr. Landm.* 67: 618-619. 1922.—An investigation of 8 localities shows that black medic may be very vigorous with a pH of 6.2 or 6.5. Surplus of water or lack of certain plant foods as well as lack of lime may inhibit its growth.—*Ernst Gram*.

6019. HARRISON, W. H. Report of the Imperial agricultural chemist. *Sci. Rept. Agric. Res. Inst. Pusa 1921-22*: 24-33. 1 pl. 1922.—Recommended methods of chemical analysis of manures, fertilizers, and soils have been collated and prepared for publication. An accurate method for the estimation of soil carbonates has been devised. The Pusa method of phosphoric acid determination is found more suited to Indian conditions than either the American 1919 or Prescott's methods.—Experiments with the windrowing of sugar cane continued. " * * * the length of time windrowed canes can be stored is determined by the incidence of heavy rains."—There is uniformly a higher percentage of CO₂ in the soil atmosphere of a grassed plot than of a cultivated plot. Excess of CO₂ is most marked in the monsoon, when high temperature and heavy rainfall favor decomposition of organic detritus from grass roots. During the dry season the moisture content of the soil of grassed plots falls as low as 1 per cent, whereas in cultivated plots it is 5.5 per cent. "Similar differences in the value of the nitric nitrogen are also found."—Movements of nitrates in the soil and sub-soil have been studied. "The investigation, so far as it has progressed, shows that the distribution of nitrates through the sub-soil is determined by climatic factors and the physical characters of the sub-soil layers, and that the growth of the crop is in turn controlled to a considerable extent by this distribution."—A list of publications for the year concludes the report.—*Winfield Dudgeon*.

6020. HASSELBALCH, K. A. Kulturplanternes forskellige Krav til Jordens Reaktion, III Rødkløver. [The different requirements of cultivated plants as to soil reaction, III *Trifolium pratense*.] *Ugeskr. Landm.* 68: 121-123. 1923.—Not the soils but the crops require lime, and they require it to a different degree. R. Christensen has indicated that oats, rye, and potatoes require less lime than do barley or clover, while alfalfa may fail on ground good for clover. This range may also be expressed in pH values, for which the author has proposed the term "Reaktionstal," i.e., reaction figure. But while soils where the relation between lime and acid is 1:2 or 10:20 have practically the same pH, they will need very different amounts of lime to raise the pH from 5 to 7. Preliminary investigations seem to indicate

that for each crop a minimum pH may be found, which must be determined only on fields where all other factors are favorable. For *Trifolium pratense* the minimum is found at 6.0-6.3 and the most copious growth occurs at 6.5 and above.—*Ernst Gram*.

6021. HASSELBALCH, K. A. Om Trivlsen af Humleagtig Sneglebælg som Maalestok for Agerjordens Kalktrang. [The vigor of *Medicago lupulina* as an indicator for the lime requirement of cultivated soils.] Ugeskr. Landm. 67: 577-579. 1922.—On the author's farm black medic has been grown in 2 cases previous to liming, the lime being withheld in those parts of the field where the medic was vigorous. Where black medic grows well the pH was 7.4 (the average of 10 locations), and in poor spots with weak plants whose leaves were yellowish green and which had few nodules, 6.8. The medic will not thrive well where the pH is below 7.0, whereas plants like wheat and barley may thrive on more acid soils. [See also Bot. Absts. 12, Entries 6012, 6013, 6018, 6025, 6028.]—*Ernst Gram*.

6022. HOFFMANN, R. Stickstoff Düngungsversuche auf Grünland. [Experiments on nitrogen-fertilization of meadow lands.] Landw. Jahrb. 58: 567-600. 1923.—Using the formulae of Mitscherlich, the author found that the yield of hay, as a result of fertilization with ammonium sulphate, can be expressed by the formula, $\log (A - Y) = \log A - 0.025 (x + z)$. The factor $C (=0.025)$ was independent of the maximum yield (A) and, therefore, also independent of all growth factors, such as climate, soil, kind of plant, etc. The value z , which indicates what part of the soil-nitrogen equivalent to ammonium sulphate is available, depends upon the soil used. Potassium phosphate fertilization had, in most cases, no appreciable effect. Nitrogen fertilization had a marked stimulating effect upon the growth of the grass, especially the timothy, the clover being almost completely repressed.—*S. A. Waksman*.

6023. KEEN, B. A. Rothamsted and the schools. Determinations of soil moisture at the end of the great drought. School Sci. Rev. [London] 3: 60-62. 1921.—The cooperation of schools with Rothamsted has given reliable data on the degree to which various depths of soil lose water during droughts, and on the moisture content of bare cultivated soil and that carrying vegetation.—*Elsie Hammond*.

6024. KILBINGER, A. Eine einfache und sichere Methode zur Bestimmung des Säuregrades und des Kalkbedarfs der Ackerböden. [A simple and reliable method for determining the degree of acidity and calcium requirements of cultivated soils.] Illus. Landw. Zeitg. 43: 44. 1923.—The measurement of acidity is obtained by the color changes from rose to deep red resulting when a given amount of soil is mixed with a solution of "Rhodan" potassium. By the same method slightly modified, it may be determined whether a non-acid soil is neutral or alkaline and, if alkaline, the degree of alkalinity.—*John W. Roberts*.

6025. MADSEN, M. Om Betydningen af Jordens Brintionconcentration ved Dyrkning af visse kalkelskende Kulturplanter. [The importance of soil acidity for the growing of certain lime-requiring crops.] Vort Landbrug 41: 562-564. 1922.—From an investigation of 39 samples of soils from alfalfa and black medic fields, it is concluded that for both crops, on both light and heavy soils, the pH required to secure a good growth is about 7.0 or higher.—*Ernst Gram*.

6026. MITSCHERLICH, E. A., F. DÜHRING, S. V. SAUCKEN, und C. BÖHM. Die pflanzen-physiologische Lösung der chemischen Bodenanalyse. [The plant physiological solution of chemical soil analysis.] Landw. Jahrb. 58: 601-617. 1923.—As a result of a series of pot experiments with soil and various mixtures of soil and sand in an attempt to solve the chemical analysis of soil by plant physiological means, the authors came to the following conclusions: The value of nitrogen as a nutrient is constant for various soils, as well as for sand, and also for various plants; this furnishes a plant physiological basis for nitrogen as a nutrient

in chemical soil analysis; in other words, vegetative experiments permit determination of the quantities of nitrogen present in a given quantity of soil in a form available to plants.—*S. A. Waksman.*

6027. NĚMEC, ANTONIN, et KVAPIL KAREL. Étude biochimique des sols forestiers. [Biochemical study of forest soils.] *Compt. Rend. Acad. Sci. Paris* 176: 260-262. 1923.—The authors report a study of the acidity of soil and the catalase activity of humus and mineral soils from forests of different kinds of trees.—*C. H. Farr.*

6028. OLSEN, C. Humleagtig Snegleblægs Forhold til Jordens Surhedsgrad (Brintion-concentration). [The relation of *Medicago lupulina* to soil acidity, pH.] *Vort Landbrug* 42: 16-19. 1 fig. 1923.—In jar experiments with a highly acid (pH = 4.0) sandy soil, rich in humus, from a raspberry formation in a forest, calcium carbonate was added so as to obtain the following pH values in the jars: 4.0, 5.1, 6.9, 7.4. When the resulting crop was weighed green the following respective weights were found as an average of 3 jars: 26, 106, 179, and 153 gm. The acidity of the soil was almost unchanged at the close of the experiment.—*Ernst Gram.*

6029. SCHÖNBRUNN, BRUNO. Über den zeitlichen Verlauf der Nitrifikation, unter besonderer Berücksichtigung der Frage nach dem periodischen Einfluss der Jahreszeit. [The temporal course of nitrification with special reference to the question of the periodic influence of the seasons.] *Centralbl. Bakt. II Abt.* 56: 545-546. 1922.—A series of soil cultures kept under different conditions were analyzed at regular intervals to determine the progress of ammonification and nitrification. Some of the cultures were kept at constant temperatures, one of the objects being to determine whether the rhythmic cycle of nitrification as it exists in nature is due entirely to the external factors of climatic variations, or whether the organisms having passed through this cycle for centuries have adapted themselves to follow a certain rhythmic course of activity independent of external factors. The results indicate that temperature is the principal factor influencing ammonification and nitrification, and that the periodic influence of the seasons, independent of climatic conditions, is negligible.—*Anthony Berg.*

6030. SEWELL, M. C. Effect of *Andropogon sorghum* on succeeding crops of *Triticum sativum* vulgare. *Bot. Gaz.* 75: 1-26. Fig. 1-11. 1923.—The author states that 5 possible causes of the harmfulness of kafir have been suggested: depletion of minerals, toxic root excretions, toxic products of decay, diseases associated with the crop, and the effect of soil protozoa and microorganisms. The author's experiments indicate that the most important of these is the "toxic decomposition products of the crop residue." Field data, covering 6 years, show the yield of winter wheat when grown after kafir to be 3 bushels less to the acre than when grown after corn. In the greenhouse, wheat growth in kafir soil was uniformly depressed. When grown in soil watered by (1) corn soil leachings, (2) aerated kafir soil leachings, and (3) non-aerated kafir soil leachings, only the 1st showed depression. Oxidation evidently destroys the toxin. In pot cultures, where wheat was watered with non-aerated leachings from trays containing growing kafir and corn, the leachings from kafir definitely inhibited the development of the wheat. The author also presents data showing that while the kafir crop removes more fertilizing elements from the soil than corn, this is not a factor in depressing the wheat yield. He also finds that the growth of kafir does not affect the ability of the soil to liberate nitrogen.—*B. W. Wells.*

6031. SKINNER, J. J., and F. E. ALLISON. Influence of fertilizers containing borax on the growth and fruiting of cotton. *Jour. Agric. Res.* 23: 433-443. Pl. 1-4. 1923.—Anhydrous borax was mixed with fertilizers and applied at the rate of 5, 10, and 20 pounds to the acre. On most soil types as little as 5 pounds to the acre injured young cotton plants. When the borax was broadcasted instead of drilled in the rows the injury was not so pronounced and

abundant rainfall also lessened the amount of injury. Borax drilled in the row at the rate of 100 pounds to the acre, or broadcasted at the rate of 200 pounds, entirely prevented germination.—*D. Reddick.*

6032. WALTON, J. H. Report of the Imperial agricultural bacteriologist. Sci. Rept. Agric. Res. Inst. Pusa 1920-21: 28-33. 1921.—Nitrogen losses from cattle dung stored under aerobic and anaerobic conditions were found to be relatively small, while urine lost 85 per cent under aerobic and only 15 per cent under anaerobic conditions. In a highly calcareous soil, as that of Pusa, solubilization of phosphate was found to take place upon composting with green manure. Fresh *Bassia latifolia* cake at first lowered the nitrate nitrogen in the soil to zero, but after 4 weeks nitrogen again began to appear, in no case, however, exceeding the percentage originally present in the soil. After composting the cake with Trichi rock phosphate or rock phosphate and sulphur for 4 weeks, 25 per cent of the nitrogen became nitrifiable, and in 1 case 45 per cent.—Promising results in the manufacture of indigo have just been obtained by sterilizing the water with "E.C." (a product developed and made at Pusa) for 12 hours before adding a pure culture of indican hydrolyzer. "The first day's working gave produce of the remarkably high quality of 78.5 per cent, which is probably the highest ever obtained in Bihar." "E.C." has proved effective also in sterilizing wells, in treatment of septic wounds, and for surgical dressings in hospitals.—Yeasts have been isolated and their fermentative power studied, and bacterial rots of potato and onion are under investigation. A program of work for 1921-22 and a list of publications for the year are appended.—*Winfield Dudgeon.*

6033. WESTERMANN, T. Undersøgelser over Fordampning fra ubevokset og bevokset Jord. [Investigations of evaporation from bare and planted soil.] K. Vet. og Landbohøjskoles Aarsskr. 1922: 1-55. 4 fig. 1922.—A system of tanks permitted study under varying atmospheric conditions, in different soils, with different water levels, cultivation, and crops. In summer the evaporation from bare sandy soil varied from 37.7 to 117.5 per cent of the natural precipitation, while for clayey soil the corresponding values were 50.5-132.8. The Papilionaceae have a high evaporating capacity, the small grains rank lower, and potato and mangold lowest of the plants investigated. In the same species the total leaf area of 2 varieties, and also the differences in growth, produced by increasing amounts of fertilizer, exert a distinct influence on the evaporation.—*Ernst Gram.*

6034. YAMANDI, JUAN G. Composición del suelo y su preparación. [Composition of the soil and its preparation.] Rev. Soc. Rural Córdoba [Argentina] 21: 6007-6026. 1922.—The author describes the various soil types and gives their physical characteristics. Soil water and its circulation in the soil are discussed as well as the manner in which plants utilize the moisture. The penetration of air and heat into the soil is necessary for seed germination, plant growth, and the development of soil organisms. The time and methods of working the soils of Argentina for best results are discussed.—*John A. Stevenson.*

6035. ZYL, C. E. VAN DER. De huidige stand der mechanische grondbewerking op Java. [The present condition of mechanical cultivation of the soil in Java.] Mededeel. Proefst. Java Suikerindust. 1922: 155-193. 1922.—The use of mechanical plows in Java is compared with hand labor. Best results were obtained on light sandy soil. On heavy soil mechanical plowing and cultivation is practical only in large fields.—*Peter J. Klaphaak.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 5392, 5442, 5465, 5474, 5480, 5738, 5748)

GENERAL

6036. COOK, O. F. Are any species uniform? Jour. Heredity 12: 285-287. 1922.—The author states his thesis in the following paragraph: "Species are maintained by processes of sexual reproduction, with continual crossing of the individual lines of descent, so that each species forms a network of lines of descent. The question of uniformity bears on the nature of the specific network. Are there reasons for believing that the members of the same species are uniform, identical, or homozygous? Or should we think of the members of species as normally diverse, with multifarious germinal constitutions represented among the different individuals and lines of descent that are woven together?"—It is pointed out that the existence of uniform species is a taxonomic ideal that has never been realized, and that unless evidence can be brought forward to prove the existence of such species the idea may as well be abandoned as interfering with clear thinking on the processes of evolution.—R. C. Cook.

6037. [DRUCE, G. C.] [Rev. of: PRAIN, DAVID, Editor. Index Kewensis. Vols. I-V, Suppl. 1-5. 1885-1921 (see Bot. Absts. 11, Entry 3199).] Rept. Bot. Soc. and Exchange Club British Isles 6: 342-347. 1921 [1922].—[See also Bot. Absts. 11, Entry 3189.]

6038. FRITSCH, KARL. Ist *Cardamine bulbifera* als Abkömmling ein Bastardes aufzufassen? [Is *Cardamine bulbifera* to be considered of hybrid origin?] Ber. Deutsch. Bot. Ges. 40: 193-196. 1922.—The author disagrees with Ernst, who considered *Cardamine bulbifera* as a hybrid. Its greater distribution than that of its supposed parents, the fact that *C. bulbifera* is not an intermediate form, and the presence of bulbils do not suggest to the author that this species is a hybrid.—W. C. Muenscher.

6039. КОЗО-ПОЛЯНСКОГО, Б. М. [KOZOT-POLJANSKI, B. M.] Введение В Филогеническую Систематику Высших Растений. [An introduction to the phylogenetic system of vascular plants.] v + 167 p., 6 pl. Природа и Культура [Nature and Culture]. Woronesh, 1922.—An outline of some lectures.—B. M. Kozot-Poljanski.

6040. PELLETT, F. C. What is cow-itch? Amer. Bee Jour. 62: 466. Fig. 1-3. 1922.—The common name cow-itch should be restricted to *Cissus incisa*. But in the South [U. S. A.] the trumpet creeper (*Tecoma radicans*) and other climbing vines are sometimes given this vernacular name.—J. H. Lovell.

6041. ROBINSON, B. L. The need of monographic activity in American botanical taxonomy. Science 57: 307-311. 1923.

PTERIDOPHYTES

6042. ANONYMOUS. Current topics and events. Nature 111: 93. 1923.—This article notes that a special exhibit of epiphytic species of *Platynerium* and some of *Polypodium* has been arranged in the tropical Fern House at Kew, and gives brief descriptions of the habits of several species.—O. A. Stevens.

6043. ALDERWERELT VAN ROSENBURGH, C. R. W. K. VAN. New or interesting Malayan Ferns. Bull. Jard. Bot. Buitenzorg III, 2: 129-136. Fig. a-h. 1920.—The author presents an annotated list of Malayan pteridophytes which contains the following new species, varieties, names, and combinations: *Alsophila heteromorpha* var. *decomposita*, *A. persquamulifera* (v. A. v. R.), *Angiopteris monstrosa*, *Aspidium papyraceum*, *Asplenium bicarinatum*, *A.*

fibrilliferum, *Athyrium macrocarpum* var. *decompositum*, *A. nigripes* var. *Clarkei* (Bedd.), *Cyathea magnifolia*, *C. Doctersii*, *C. binnangensis*, *C. Ramosiana*, *C. amphicosmioides*, *C. densisora*, *Cyclophorus brevipes*, *C. elaphoglossoides*, *Davallia subdissecta* var. *subgenuina*, *Diplazium mesocarpum*, *D. betimusense*, *Dryopteris paraphysophora*, *D. Mannii* (Hope), *D. microcarpa*, *D. tabacifera*, *D. pterospora*, *D. echinospora*, *D. perglandulifera* var. *firmior*, *D. verruculosa* var. *sumatrana*, *D. subfalcinella*, *D. stipellata* var. *obtusata*, *D. submollis*, *Hemitelia montana*, *H. fallax* var. *major*, *H. paraphysophora*, *Histiopteris conspicua*, *Humata lanuginosa*, *H. squarrosa*, *Lecanopteris carnosa* var. *pumila*, *Lindsaya repens* var. *pseudohemiptera*, *Lomagramma sumatrana*, *L. pteroides* var. *negrosensis* (Copel.) and var. *subcoriacea* (Copel.), *Loxogramma prominens*, *L. vittariifolia*, *Mesochlaena sumatrensis*, *Phegopteris lastreoides*, *P. fallax*, *P. rubicunda*, *Plagiogyria subrigida*, *Pleocnemia stenosemioides*, *Pleopeltis subnormalis*, *P. parvifrons*, *P. dendroconchoides*, *P. congregatifolia*, *P. murkeleana*, *P. contigens*, *P. Treubii* var. *Brooksii*, *Polypodium ceramicum*, *P. mutatum*, *P. Yoderi* var. *denudatum*, *P. revolvens*, *Polystichum prolificans*, *P. puncticulatum*, *Pteris appendiculifera*, *P. aberrans*, *Syngamma luzonica*, *Tapeinidium sumatranum*, *Trichomanes minimum*, *T. paniculatum* var. *minus*, *Lycopodium patentissimum*, *L. pinifolium* var. *lanceolatum*, *Selaginella simalurana*, *S. consobrina*, *S. sunaquatilis*, *S. congregata*, *S. flabelliformis*, *S. balica*, *S. xerophila*, *S. fimbriata* var. *grandifolia*, *S. heteromorpha*, *S. rubicundipes*, *S. herpocaulos* var. *acuminata*, *S. Wallichii* var. *deliana*.—Alfred Rehder.

6044. MAXON, WM. R. A new *Salvinia* from Trinidad. Jour. Washington [D. C.] Acad. Sci. 12: 400-401. 1922.—*Salvinia cyathiformis* is described.—Helen M. Gilkey.

6045. MAXON, WM. R. The genus *Culcita*. Jour. Washington [D. C.] Acad. Sci. 12: 454-460. 1922.—The writer considers *Balantium* of the family Cyatheaceae a technical synonym of *Dicksonia*, and advises the substitution of *Culcita* for *Balantium* as known today, since this is an equivalent of the *Balantium* of present writers. Eight species are described 1 of these, *C. blepharodes*, being new.—Helen M. Gilkey.

SPERMATOPHYTES

6046. ALDERWERELT VAN ROSENBURGH, C. R. W. K. VAN. New or noteworthy Malayan Araceae. Bull. Jard. Bot. Buitenzorg III, 1: 359-389. 1919.—The author presents descriptions of, and notes on, Malayan Araceae preceded by an artificial key to the genera. The following species and combinations are new: *Amorphophallus subcymbiformis*, *A. Lorzingii*, *A. Brooksii*, *A. Decus silvae*, *A. timorensis*, *A. Hewittii*, *A. paucisectus*, *A. discophorus*, *Anadendron microstachyum* (De Vries & Miq.), *A. malaianum* (Miq.), *A. superans*, *Cyrtosperma syapense*, *C. cuspidispathum*, *C. subulispalum*, *C. hastatum*, *C. consobrinum*, *Epipremnum ceramense* (Engl. & Krause) and var. *flavispathum*, *E. papuanum*, *E. silvaticum*, *E. mampuanum*, *Lasia concinna*, *Pothos longivaginatus*, *P. Jacobsonii*, *P. Englerianus*, *P. peninsularis*, *P. brevivaginatus*, *Raphidophora crassifolia* (Engl.), *R. celatocaulis* (N. E. Br.), *R. apiculata*, *R. conocephala*, *R. talamauana*, *R. Hallieri*, *R. pilosula*, *Scindapsus mamilliferus*, *S. javanicus*.—Alfred Rehder.

6047. ALMQUIST, ERNST. *Bursa pastoris* Weber. Rept. Bot. Soc. and Exchange Club British Isles 6: 179-207. 9 fig. 1920 [1921].—G. C. DRUCE in the Introduction (pp. 179-190) shows that *Bursa* has priority over *Capsella*. He also gives a history of its segregates. Almquist gives descriptions of 18 species.—G. C. Druce.

6048. AMES, OAKES. A discussion of *Pogonia* and its allies in the Northeastern United States. Orchidaceae 7: 3-38. Pl. 102-108. 1922.—A key is given to 5 genera, namely, *Pogonia*, *Cleistis*, *Isotria*, *Triphora*, and *Psilochilus*. New names are: *Triphora gentianoides* Ames & Schltr. (*Arethusa gentianoides* Sw.) and *Cleistis divaricata* Ames (*Arethusa divaricata* Linn.).—E. D. Merrill.

6049. AMES, OAKES. A new *Oncidium* from Haiti. *Orchidaceae* 7: 159-160. 1922.—*Oncidium haitiense* Leonard & Ames is described as new.—E. D. Merrill.

6050. AMES, OAKES. A triandrous form of *Psilochilus macrophyllus*. *Orchidaceae* 7: 45-48. Pl. 110. 1922.—A new name, *Psilochilus macrophyllus* (Lindl.) Ames, is published, based on *Pogonia macrophylla* Lindl.—E. D. Merrill.

6051. AMES, OAKES. Additions to the orchid flora of the mountain province, Luzon. *Orchidaceae* 7: 141-155. 1922.—The following new species are described: *Acoridium lineari-folium*, *A. perplexum*, *A. pulcherrimum*, *A. unicorne*, *Bulbophyllum alboroseum*, *B. invisum*, *B. papillipetalum*, *Ceratostylis dataensis*, *Eria carnicolor*, *Habenaria boadanensis*, and *H. reticulata*.—J. M. Greenman.

6052. AMES, OAKES. New or noteworthy orchids from different parts of the world. *Orchidaceae* 7: 83-140. Pl. 114. 1922.—The following new species are proposed: *Bulbophyllum cubicum* (Philippines), *B. erratum* (Philippines), *B. nigroscapum* (Samoa), *Campylocentrum panamense* (Panama), *Coelogyne longirachis* (Philippines), *C. Ramosii* (Philippines), *Dendrobium appendiculoides*, *D. candoonense*, *D. sinuosum*, and *Dendrochilum prodigiosum* (Philippines), *Epidendrum sulcatum* (Colombia), *Eria candoonensis*, *E. hirsutipetala*, *E. macera*, *E. microchila*, *E. propinqua*, and *E. vagans* (Philippines), *Liparis magnicallosa*, *L. prava*, and *L. propinqua* (Philippines), *Malaxis bracteosa* (Philippines), *Notylia panamensis* (Panama), *Oberonia linearifolia* (Borneo), *O. lipensis* and *O. minutissima* (Philippines), *Pleurothallis consimilis* (Trinidad), *P. Hitchcockii* (British Guiana), *P. Schaferi* (Cuba), *P. Williamsii* (Panama), *Plocoglottis McGregorii* (Philippines), *Robiquetia Merrillii* Ames (*Malleola Merrillii* Ames), *R. Ramosii* (Philippines), *Sarcophilus tripercus* (Philippines), *Spiranthes bicaudata* (Trinidad), *S. Wrightii* nom. nov. (*Spiranthes monophylla* Cogn. p.p., Cuba), *Stelis parvibracteata* (Panama), *S. pleurothalloides* (Colombia), *S. Williamsii* (Panama), *Thrix-spermum Weberi* (Philippines), and *Trichoglottis brachiata* (Philippines). Critical notes are given on a number of older species proposed by various authors.—E. D. Merrill.

6053. AMES, OAKES. Nomenclatorial changes in *Dendrochilum*. *Orchidaceae* 7: 79-82. 1922.—A new genus, *Pseudacoriidum*, with *P. Woodianum* Ames, based on *Dendrochilum Woodianum* Ames from the Philippines, is described, and the following new names in *Acoridium* appear, based on Philippine species of *Dendrochilum*: *Acoridium affine*, *A. anfractoides*, *A. auriculare*, *A. binuangense*, *A. cinnabarinum*, *A. confusum*, *A. Curranii*, *A. Elmeri*, *A. exile*, *A. Foxworthyi*, *A. hastatum*, *A. Hutchinsonii*, *A. irigense*, *A. Loheri*, *A. longibulbum*, *A. lucbanense*, *A. luzonense*, *A. maleolens*, *A. McGregorii*, *A. microchilum*, *A. mindorense*, *A. pulogense*, *A. pumilum*, *A. purpureum*, *A. quadrilobum*, *A. reniforme*, *A. simulacrum*, *A. Vanoverberghii*, and *A. Wenzelii*.—E. D. Merrill.

6054. AMES, OAKES. Notes on *Erythrodes* with nomenclatorial changes and descriptions of three new species. *Orchidaceae* 7: 63-78. 1922.—The new species are *Erythrodes chicharrasensis* Ames and *E. mexicana* Ames from Chiapas, Mexico, and *E. trinitatis* Ames from Trinidad. The generic name *Erythrodes* Blume, having priority over *Physurus* L. C. Rich. is adopted and the following new names appear, transfers from *Physurus*: *Erythrodes aratanhensis*, *E. arietina*, *E. argyrosticta*, *E. bicolor*, *E. bifalcis*, *E. brachyrhyncha*, *E. calophylla*, *E. caucana*, *E. clavigera*, *E. commelinoides*, *E. debilis*, *E. densiflora*, *E. dolichostachya*, *E. erythrodoides*, *E. foliosa*, *E. hetaerioides*, *E. hyphaematica*, *E. humilis*, *E. juruenensis*, *E. lacteola*, *E. Lehmannii*, *E. Lindleyana*, *E. loxoglottis*, *E. lunifera*, *E. maculata*, *E. major*, *E. Mayorianana*, *E. metallescens*, *E. minor*, *E. mystacina*, *E. nigrescens*, *E. ovata*, *E. paleacea*, *E. parviflora*, *E. Petersiana*, *E. Pittieri*, *E. procera*, *E. rariflora*, *E. repens*, *E. rosea*, *E. stenocentron*, *E. stictophylla*, *E. tridax*, *E. Tuereckheimii*, *E. vaginata*, *E. valida*, *E. rescifera*, *E. xystophylla*, and *E. zeuxinoides*.—E. D. Merrill.

6055. AMES, OAKES. Notes on Mexican species of *Triphora*. *Orchidaceae* 7: 39-44. Pl. 109. 1922.—*Triphora yucatanensis* Ames is described and figured as new, and notes on, and a figure of, *T. mexicana* Schltr. are given.—E. D. Merrill.

6056. AMES, OAKES. Studies of *Otostylis brachycalyx* and the species with which it has been confused. *Orchidaceae* 7: 49-62. Pl. 111-113. 1922.—*Cyrtopodium Broadwayi* Ames from Trinidad is figured and described as new. *Otostylis brachycalyx* Schltr. and *Cyrtopodium cristatum* Lindl. are figured and discussed.—E. D. Merrill.

6057. AMES, OAKES. Two new species of *Malaxis* from Haiti. *Orchidaceae* 7: 156-158. 1922.—*Malaxis domingensis* and *M. Leonardii* are described as new; while the following new combinations are made: *Malaxis carpinterae* (*Microstylis carpinterae* Schltr.), and *M. Adolphii* (*Microstylis Adolphii* Schltr.).—E. D. Merrill.

6058. BACKER, C. A. Contributiones ad cognitionem florae Indiae Batavae. [Contributions to the knowledge of the flora of Dutch East India.] *Bull. Jard. Bot. Buitenzorg* III, 2: 315-330. 1920.—The paper contains a note on *Heliconia indica* Lam.; a description of the new Melastomataceous genus *Triuranthera*, with the 1 species *T. Bakhuizenii*; and descriptions of the following new species, varieties, and combinations: *Aristolochia coadunata* var. *Bossschai*, *A. tripartita*, *Bauhinia viridiflora*, *Crotalaria Valetonii*, *Diplachne polystachya* (Forsk.), *D. tectoneticola*, *Gentiana singgalangensis*, *Mapania Heyneana*, and *Sonneratia ovata*.—Alfred Rehder.

6059. BLAKE, S. F. New composites from Salvador. *Jour. Washington [D. C.] Acad. Sci.* 13: 143-146. 1923.—*Vernonia Standleyi*, *Rensonia salvadorica*, and *Zexmenia iners* are described as new species, with *Rensonia* as a new genus.—Helen M. Gilkey.

6060. BLAKE, S. F. New South American Asteraceae collected by E. W. D. Holway. *Bot. Gaz.* 74: 414-430. Pl. 19. 1922.—Material from Ecuador and Bolivia is dealt with here. The following species are described: *Achyrocline glandulosa*, *A. hyperchlora*, *Polymnia eurylepis*, *Monopholis* gen. nov., *M. hexantha*, *M. Holwayae*, *Wedelia Holwayi*, *W. isolepis*, *Helianthus hypargyreus*, *Perymenium ecuadoricum*, *Steiractinia Rosei*, *Verbesina adenobasis*, *V. latisquama*, *Calea huigrensis*, *Gynoxys hypomalaca*, *Mutisia sagittifolia*, *Hieracium pazense*.—B. W. Wells.

6061. BLAKE, S. F. Three new composites from Bolivia. *Proc. Biol. Soc. Washington* 36: 51-54. 1923.—*Erigeron seneciiformis*, *Aspilia lucidula*, and *Calea rhombifolia* are described as new.—J. C. Gilman.

6062. BLAKE, S. F. Two new genera related to *Narvalina*. *Jour. Washington [D. C.] Acad. Sci.* 13: 102-105. Fig. 1. 1923.—The writer proposes *Cyathomone* and (in collaboration with EARL E. SHERFF) *Ericentrodea*, both genera being based principally upon achene characters. *Ericentrodea* includes the plants originally described under *Narvalina corazonensis* Hieron., *N. homogama* Hieron., and *Bidens mirabilis* Sherff; while the single representative of *Cyathomone* was formerly described under the name *Narvalina Sodiroi* Hieron.—Helen M. Gilkey.

6063. BRITTON, C. E. British Centaureas of the Nigra group. *Rept. Bot. Soc. and Exchange Club British Isles* 6: 406-417. 1921 [1922].—*C. surrejana* and *C. Drucei* are described as new and 4 new varieties are noted.—G. C. Druce.

6064. BRITTON, N. L., AND J. N. ROSE. The two species of deerhorn cactus. *Jour. Washington [D. C.] Acad. Sci.* 12: 328-330. Fig. 1-2. 1922.—To the formerly monotypic genus *Peniocereus*, has been added a second species, *P. Johnstonii*, collected by Ivan M. Johnston in the islands of the Gulf of California. A description of the new species and a key are included.—Helen M. Gilkey.

6065. BRITTON, N. L., AND PAUL C. STANDLEY. Three new plants of the family Rubiaceae from Trinidad. Jour. Washington [D. C.] Acad. Sci. 13: 105-107. 1923.—*Evea tontaneoides*, *Urceolaria clusiaefolia*, and *U. angustifolia* are described.—Helen M. Gilkey.

6066. CAMUS, E. G., ET A. CAMUS. Iconographie des Orchidées d'Europe et du Bassin Méditerranéen. [Illustrations of orchids of Europe and of the Mediterranean Basin.] 4 to 72 p.; folio 122 pl. Paul Lechevalier: Paris, 1921.—This work, as the title indicates, is primarily a collection of illustrations of orchids. Descriptions, synonymy, and bibliography are omitted, except for the new varieties, forms, and hybrids. The authors, however, give full explanations of the plates of which 110 are in color and depict the habit of the entire plant as well as detailed characters of the flowers. The remaining 12 plates are uncolored and illustrate the anatomy of various species. The new varieties, forms, and hybrids included are: *Serapias Lingua* L. f. *nana* G. Cam., × *S. Laramberguei* f. *laxiflora* G. Cam., × *S. meridionalis* G. Cam. var. *lutescens* G. & A. Cam., ×× *Orchiserapias complicata* var. *latiloba* G. Cam., ×× *O. complicata* var. *angustiloba* G. Cam., ×× *O. Fontanae* G. Cam., Berg. & A. Cam. var. *trisecta* G. & A. Cam., *Loroglossum hircinum* Rich. var. *immaculatum* G. & A. Cam., *Orchis papilionacea* L. var. *minima* G. Cam., *O. latifolia* L. var. *Barlae* G. Cam., *O. maculata* L. var. *brachystachys* A. Cam., × *O. Cortesii* G. & A. Cam. = *O. longicornu* × *Morio* G. & A. Cam., × *O. Braunii* Halacsy var. *alpina* A. Cam. = *O. latifolia* × *maculata* var. *brachystachys* A. Cam., ×× *Orchigymnadenia Heinzeliana* G. Cam. var. *gracilis* A. Cam. = *Gymnadenia conopsea* × *O. maculata* var. *brachystachys* A. Cam., *Ophrys Scolopax* Cav. f. *viridiflora* A. Cam., *O. apifera* subsp. *Olympiadae* Ougrinski, × *O. Cortesii* A. Cam. = *O. atrata* × *litigiosa* A. Cam.—J. M. Greenman.

6067. COHEN STUART, C. P. A basis for tea selection. Bull. Jard. Bot. Buitenzorg III, 1: 193-320. Pl. 21-31. 1919.—The paper is an enlarged English translation of the botanical part of the author's Dutch thesis on tea selection published in 1916; it is divided into 2 parts, an historical and geographical, and a systematic part. In the 1st, the author deals with the historical development of the cultivation of the tea plant in Java, British India, and China and with its origin and geographical distribution. In the 2nd, he gives first his reasons for uniting *Camellia* and *Thea* under the name *Camellia*, and a key to the known species of the genus; in another chapter, the varieties of the Tea plant, *Camellia theifera*, are discussed; and the last chapter deals with 4 critical species. An enumeration of the herbarium specimens examined and a bibliography conclude the paper. One species, *Camellia Henryana*, and the following combinations are new: *C. hozanensis* (Hay.), *C. Nakaii* (Hay.) and *C. furfuracea* (Merr.).—Alfred Rehder.

6068. HARMS, H. Ueber Luetzelburgia, eine neue Gattung der Leguminosen aus Brasilien. [Luetzelburgia, a new genus of Leguminosae from Brazil.] Ber. Deutsch. Bot. Ges. 40: 177-180. Fig. 1. 1922.—A new genus, *Luetzelburgia*, is based upon and described from flowering material collected by Ph. von Luetzelburg. This genus is placed in *Sophoreae* but it suggests a connecting link between *Sophoreae* and the higher *Papilionate*. A single species, *L. pterocarpoides*, is described.—W. C. Muenschner.

6069. JUMELLE, HENRI. Le groupe du *Chrysalidocarpus lutescens*. [The group of *Chrysalidocarpus lutescens*.] Compt. Rend. Acad. Sci. Paris 174: 1674-1677. 1922.—This species is a palm of Madagascar. It is separated with difficulty from other species of the same genus, several of which are discussed in this paper.—C. H. Farr.

6070. KILLIP, E. P. Three new species of *Passiflora* from Venezuela and Ecuador. Jour. Washington [D. C.] Acad. Sci. 12: 330-332. 1922.—*Passiflora* (*Granadilla*) *dispar*, *P.* (*Granadilla*) *perlobata*, and *P.* (*Granadilla*) *Popenorii* are described.—Helen M. Gilkey.

6071. KOORDERS, S. H. Beitrag zur Kenntniss der Flora von Java, no. 10, 11 und 15-20. [Contribution to the knowledge of the flora of Java, No. 10, 11 and 15-20.] Bull. Jard. Bot. Buitenzorg III, 1: 136-189. Pl. 7-19. 1919.—This paper consists of separate articles con-

taining notes on various Javanese plants and descriptions of new species. It is preceded by an index to Nos. 1-20 of these contributions giving the title and place of publication of the numbers not contained in the present paper. The contents of the present numbers are as follows: No. 10, *pl. 7, 8*: description of *Elaeocarpus littoralis* Teijsm. & Binn.; No. 11, *pl. 9*: description of *Glochidion palustre* n. sp.; No. 12, *pl. 10*: note on *Clethra javanica* Turcz.; No. 15: description of *Coix palustris* n. sp.; No. 16: note on *Cyrtosperma Merkusii* Schott; No. 17, *pl. 11-13*: description of *Alocasia bantamensis* n. sp., and note on the juvenile form of *Cassia javanica* L.; No. 18, *pl. 14, 15*: description of *Kalanchoe Schumacheri* n. sp., and revision of the Crassulaceae of Java; No. 19, *pl. 16, 17*: description of *Pentapanax elegans* n. sp., with var. *pubescens*; No. 20, *pl. 18, 19*: description of *Zingiber Vanlithianum* n. sp.—*Alfred Rehder*.

6072. KOORDERS, S. H. Beschreibung einer von Dr. Ouwehand im Toba-See, in Sumatra, entdeckten neuen Art von Coix. [Description of a new species of Coix discovered by Dr. Ouwehand in Lake Toba in Sumatra.] Bull. Jard. Bot. Buitenzorg III, 1: 190-191. Pl. 20. 1919.—Description is given of *Coix Ouwehandii* n. sp.—*Alfred Rehder*.

6073. KOORDERS, S. H. Supplement op het Eerste Overzicht der Flora van N. O. Celebes. 2. Untersuchungen über einige in den Jahren 1894-1895 von mir in N. O. Celebes gesammelten Pflanzen. [Supplement of the first conspectus of the flora of N. E. Celebes. Pt. 2. Studies of some plants collected by myself in 1894-95 in N. E. Celebes.] Bull. Jard. Bot. Buitenzorg III, 2: 242-260. Pl. 4-7. 1920.—The contents of part 1 of the Supplement which appeared as a separate publication in 1918 is given. Part 2 contains the following articles: 1, a note on *Hoya maxima* (Karst.) published here as a new combination and as the type of a new subgenus *Paraconchophyllum* which also includes *H. imbricata* Callery and the new *H. pseudo-maxima* from the Philippines, while the remaining species are referred to the new subgenus *Eusperlingia*; 2, a note on *Clethra canescens* Reinw.; 3, description and figure of *Elaeocarpus rhizophorus* n. sp.—*Alfred Rehder*.

6074. MIYABE, KINGO, AND YUSHUN KUDO. Icones of the essential forest trees of Hokkaido. 27 × 38.5 cm. Fasc. IV. P. 39-48, pl. 11-13. April, 1921; Fasc. V. P. 49-56, pl. 14-16. September, 1921; Fasc. VI. P. 57-64, pl. 17-19. November, 1921. Published by the Hokkaido Government.—These fascicles continue the work on the same plan as those previously published, and each fascicle contains descriptions and colored illustrations of 3 species. The species included, in order of their enumeration, are as follows: *Populus Maximowiczii* A. Henry, *P. Sieboldi* Miq., *Salix Urbaniana* v. Seem. var. *Schneiderii* Miyabe & Kudo nom. nov. (*S. cardiophylla* Tokubuchi, not Trautv. & Mey.), *S. jessoensis* v. Seem., *S. Caprea* L., *S. rorida* Lacks., *S. viminalis* L. var. *yezoensis* C. K. Schn., *S. sachalinensis* Fr. Schm., and *S. Miyabeana* v. Seem. [See also Bot. Absts. 10, Entry 329.]-*J. M. Greenman*.

6075. OSTERHOUT, GEO. E. What is *Geranium caespitosum* James? Bull. Torrey Bot. Club 50: 81-84. 1923.—Evidence is presented to show that *Geranium caespitosum* James should be called *G. intermedium* James, and that *G. atropurpureum* Heller is not a synonym, but refers to a different species, while *G. Parryi* (Engelm.) Heller is a synonym of *G. intermedium*.—*P. A. Munz*.

6076. REHDER, ALFRED. Michaux's earliest note on American plants. Jour. Arnold Arboretum 4: 1-8. 1923.—The little known note on American plants sent by A. Michaux to Lamarck and published by him in 1792 with remarks on many of the species in Journal d'Histoire Naturelle is reprinted. An attempt is made to identify the names, which are only partly supplied with descriptions, with recognized species and their nomenclatural status is discussed. Some of the names proposed are not found in Michaux's Flora and not mentioned in Index Kewensis nor in any publications on American plants. Fortunately all these names remain synonyms for various reasons and no changes in nomenclature result from their identification except a possible one in the case of Michaux's *Andromeda wilmingtonia*.—*Alfred Rehder*.

6077. RICCOBONO, VINCENZO. *Pilocereus Catalani* Ricc., nov. spec. Bull. R. Orto Bot. Palermo 2: 223-228. 1921.—Diagnosis and descriptive notes are given of a new *Pilocereus*, the origin of which is unknown.—*Edith K. Cash.*

6078. SANT'ANTIMO, PRINCIPE. *Le Palme di Villa Lucia*. [The palms of the Villa Lucia.] 8vo., 86 p., 31 pl. Tip. Giuntina: Florence.

6079. STANDLEY, PAUL C. New species of plants from Mexico. Jour. Washington [D.C.] Acad. Sci. 13: 5-8. 1923.—From collections of plants made by C. Conzatti in the state of Oaxaca, Mexico, the following new species are described: *Allionia grandiflora*, *Caesalpinia Ortega*, *Amyris Conzattii*, *Schaefferia oaxacana*, *Bouvardia oaxacana*, *Chomelia barbata*, and the tree previously described under the name *Pithecolobium tomentosum* Micheli, is transferred to the genus *Albizzia*, with the specific name *tomentosa*.—*Helen M. Gilkey.*

6080. VALETON, TH. *Cominsia minor* Val. (Marantaceae). Bull. Jard. Bot. Buitenzorg III, 2: 351-353. Pl. 11. 1920.—*Cominsia minor* a new shrubby species from southwestern New Guinea is described and figured.—*Alfred Rehder.*

6081. VALETON, TH. *Stichianthus* Val. genus novum. Rubiacearum. [Stichianthus, a new genus of Rubiaceae.] Bull. Jard. Bot. Buitenzorg III, 2: 349-350. Pl. 10. 1920.—The new genus *Stichianthus* with one species, *S. minutiflorum* [sic], from Borneo is described and figured.—*Alfred Rehder.*

6082. VALETON, TH. Zwei Rhizophoraceen. [Two Rhizophoraceae.] Bull. Jard. Bot. Buitenzorg III, 2: 346-348. Pl. 8-9. 1920.—The author describes and figures *Pellacalyx axillaris* Korth. with the new var. *serratifolia* and the new species *Carallia Hulstijnii*.—*Alfred Rehder.*

6083. WILSON, ERNEST H. The Rhododendrons of northeastern Asia exclusive of those belonging to the subgenus *Anthodendron*. Jour. Arnold Arboretum 4: 33-56. 1923.—Eleven species are recognized in the region under consideration, belonging to the subgenera *Eurhodendron*, *Azaleastrum*, and *Therorhodion*. Keys to the subgenera, sections, and species are provided and of each species the complete synonymy and a description are given and the known varieties, forms, and hybrids enumerated; a new hybrid *Rhododendron Watereri* (R. Metternichii var. *pentamerum* × *catawbiense* hybrid) is described.—*Alfred Rehder.*

REVISIONS AND MONOGRAPHS

6084. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. VI. Part 7. P. 341-418, pl. 232-235. John Spence: Sydney, January, 1922.—The present part contains descriptions and illustrations of the following Australian and Tasmanian species: *Eucalyptus agglomerata* Maiden, *E. Simmondsii* n. sp., *E. sepulchralis* F.v.M., *E. torquata* Luehmann, *E. kalganensis* n. sp., *E. melanoxylon* n. sp., *E. Isingiana* n. sp., and *E. aggregata* Deane & Maiden. Under the caption of The Leaf the author continues his discussion of the leaf of *Eucalyptus*, particularly with reference to venation and oil content.—*J. M. Greenman.*

FLORISTICS AND PLANT DISTRIBUTION

6085. ASCHERSON, PAUL, UND PAUL GRAEBNER. Synopsis der mitteleuropäischen Flora. [Synopsis of the flora of central Europe.] Lieferung 91. Vol. V. P. 465-544. Wilhelm Engelmann: Leipzig, June 27, 1916.—The present part continues the treatment of the Caryophyllaceae and includes the genera *Moeckringia* in part, *Arenaria*, *Holosteum*, and *Stellaria* in part.—*J. M. Greenman.*

6086. AUDAS, J. H. Through the Balangum Ranges and at Rose's Gap (Grampians). Victorian Nat. 38: 4-8, 11-16. 1921.—A description of a trip through the Balangum Ranges is given with detailed reference to the flora of the district.—*Wm. Randolph Taylor.*

6087. AUDAS, J. H. **Through the Murra Murra country (Western Grampians).** Victorian Nat. 37: 59-65. 1921.—A description of a trip through the Murra-Murra country is given with detailed reference to the flora of the district. Previous collectors reported 686 ferns and flowering plants, which the present writer was able to increase to 737.—*Wm. Randolph Taylor.*

6088. BABINGTON, CHARLES CARDALE. **Manual of British botany.** 10th ed., with amended nomenclature and an appendix, edited by A. J. WILMOTT. *Small 8vo, 668 p.* Gurney & Jackson: London, 1922.

6089. BERTSCH, K. **Ein Kriegsopfer unserer Flora.** [A sacrifice of our flora to the war.] Jahresh. Ver. Vaterländ. Naturk. Württemberg 77: xxvii-xxviii. 1921.—The rare *Saxifraga amphibia* formerly grew at 2 localities on the Württemberg shores of the Lake of Constance. One of the colonies was destroyed during the war by the establishment of an aeroplane station in the immediate vicinity. The distribution of the species is discussed, the idea being expressed that it represents a relic of the Ice Age.—*A. W. Evans.*

6090. BRITTON, C. E. **British forms of Centaurea Jacea L.** Rept. Bot. Soc. and Exchange Club British Isles 6: 163-173. 1920 [1921].

6091. BRITTON, N. L. **Further botanical studies in Trinidad.** Jour. New York Bot. Gard. 22: 93-102. 1921.—Field observations on the flora and vegetation of Trinidad are recorded.—*H. A. Gleason.*

6092. BROADWAY, W. E. **Botanical collecting in French Guiana.** Jour. New York Bot. Gard. 22: 177-183. 1921.—Field notes on the flora and vegetation near Cayenne are recorded.—*H. A. Gleason.*

6093. BROWN, G. C. **Report of the distributor for 1920.** Rept. Bot. Soc. and Exchange Club British Isles 6: 209-259. 1921 [1922].—The sheets contributed by members for the 1920 distribution amounted to 4,837. Among critical genera which were well represented were *Euphrasia*, *Mentha*, *Centaurea*, and *Potamogeton*. *Ranunculus* and *Erophilia* received little attention.—*G. C. Druce.*

6094. BUTCHER, R. W. **Plant notes, etc., for 1921.** [*Tillaea aquatica* L.] Rept. Bot. Soc. and Exchange Club British Isles 6: 281. 1 fig. 1921. [1922].—This was first found in Britain by the author September, 1921. It is further described by G. C. Druce [see Bot. Absts. 12, Entry 6101].—*G. C. Druce.*

6095. COCKS, R. S. **A list of the trees of Louisiana.** Jour. Arnold Arboretum 2: 204-216. 1921 [1922].—The author presents an enumeration of all the trees native in Louisiana, based upon collections made by himself during the last 15 or 16 years. Under each species and variety a short note on the habitat is given and the flowering and fruiting time recorded. Of 8 exceptionally large trees the height and girth are given.—*Alfred Rehder.*

6096. DEAM, CHAS. C. **Plants new to Indiana-IX.** Proc. Indiana Acad. Sci. 1920: 225-228. 1921.—Thirty-three species, distributed among 29 genera of angiosperms, are reported as new to Indiana. Locality and habitat are given for each species.—*F. C. Anderson.*

6097. DEAM, CHARLES C. **Plants new to Indiana. X.** Proc. Indiana Acad. Sci. 1921: 101-103. 1922.—The list consists of 18 species of angiosperms distributed among 16 genera. The location and habitat are given for each species.—*F. C. Anderson.*

6098. DENSLOW, H. M. **Passaic County, N. J.** Torreyia 23: 31-32. 1923.—Brief notes are given on species of vascular plants collected in this county in September, 1922.—*J. C. Nelson.*

6099. DRUCE, G. C. *Flora Zetlandica*. Rept. Bot. Soc. and Exchange Club British Isles 6: 457-546. 1921 [1922].—The author notes 428 species including adventives and about 200 varieties and forms. The total Zetland flora consists, as at present ascertained, of 443 native and 59 adventive species. Seventy others have been recorded which are mostly errors of identification. Among the plants gathered were *Tolypella nidifica*, a great extension of its known range, *Potamogeton rutilus*, and a new variety of a hybrid of *P. pectinatus*.—G. C. Druce.

6100. DRUCE, G. C. *New county and other records*. [Phanerogams of Britain.] Rept. Bot. Soc. and Exchange Club British Isles 6: 108-163. 1920 [1921]; 369-404. 1921 [1922].

6101. [DRUCE, G. C.] *Plant notes for 1921*. Mostly new plants to the British Isles. Rept. Bot. Soc. and Exchange Club British Isles 6: 272-273, 275-276, 281-282, 283-290, 295, 309, 311, 314-317, 321, 326. 1921 [1922].—Notes are given of the following: *Brassicagallica* (Willd.) comb. nov., *Silene italica* Pers., *Tillaea aquatica* L., *Solidago cambrica* Huds. and new varieties, *T. lingulatum* Dalst. nov. sp., *Orchis latifolia* L., *O. praetermissa* Druce, *O. maculata* L. (= *O. ericetorum* Linton), *O. maculata* L. var. *subintegriflora* Druce, *Agrostis tenuis* Sibth. (= *A. capillaris* L.) and its varieties, and *Poa trivialis* L. var. *septrionalis* nov. var.—G. C. Druce.

6102. DRUCE, G. C., AND D. LUMB. *Plant notes, etc., for 1921*. [*Euphrasia septentrionalis* nov. sp.] Rept. Bot. Soc. and Exchange Club British Isles 6: 298-300. 1921 [1922].

6103. GESSLER, ROBERT, UND MAX [GESSLER]. *Beiträge zur Flora von Stuttgart*. [Contributions to the flora of Stuttgart.] Jahresh. Ver. Vaterl. Naturk. Württemberg 77: 51-62. 1921.—The authors present the results of their exploration in the vicinity of Stuttgart, Germany, made between 1909 and 1919, their paper representing a supplement to Kirchner's *Flora von Stuttgart und Umgebung*, published in 1888. The species listed number 183 and include 5 fugitive garden plants and 5 indigenous species or varieties not recorded for the region by Kirchner. Under the remaining species new stations are reported, accompanied in several cases by notes on distribution. Attention is called to the extinction or increasing rarity of certain species that were formerly abundant.—A. W. Evans.

6104. GLEASON, H. A. *Botanizing in British Guiana*. Jour. New York Bot. Gard. 22: 161-168. 1921.—The author presents a narrative of a collecting trip with notes on the flora and vegetation.—H. A. Gleason.

6105. GOOR, E. *En Perse (fin)*. [In Persia (concluded).] Bull. Soc. Centrale Forest. Belgique 1921: 89-98. 1921.—Notes, botanical and forestry, taken on a journey through Persia from October to November, 1913, are recorded.—W. C. Lowdermilk.

6106. GREGORY, E. S. *Violet notes in 1920*. Rept. Bot. Soc. and Exchange Club British Isles 6: 174-175. 1920 [1921].

6107. GRIERSON, R. *Adventive plants of the Dublin area, 1921*. Rept. Bot. Soc. and Exchange Club British Isles 6: 406. 1921 [1922].

6108. GRIERSON, R. *Adventive plants of the Glasgow area, 1921*. Rept. Bot. Soc. and Exchange Club British Isles 6: 405. 1921 [1922].

6109. HASTINGS, G. T. [Rev. of: BROWN, H. P. *Trees of New York, native and naturalized*. New York State Coll. Forest. Tech. Publ. 15. 401 p., 133 pl. 1921.] *Torreyia* 23: 35-36. 1923.—One hundred and thirty-three species of trees, of which 109 are native, are described and illustrated, with notes on distribution and uses. Three keys are furnished. No shrubs are included.—J. C. Nelson.

6110. HEIMLICH, LOUIS F. Native plants of White County—III. Proc. Indiana Acad. Sci. 1920: 219–224. 1921.—The list includes 120 species of angiosperms, 115 of herbs, and 5 of shrubs, most of which were collected in Honey Creek Township, White County, Indiana.—F. C. Anderson.

6111. HEIMLICH, LOUIS F. Plants of White County—IV. Proc. Indiana Acad. Sci. 1921: 117–119. 1922.—The article is a list of 70 species of ferns and flowering plants distributed among 53 genera.—F. C. Anderson.

6112. KERSHAW, J. A. Ooldea plants. Victorian Nat. 38: 128–130. 1922.—A list is given of 42 species collected by the author near Ooldea, 350 miles west of Port Augusta.—Wm. Randolph Taylor.

6113. LACAITA, C. C. *Cerastium hirsutum* Tenore. Jour. Bot. 60: 56. 1922.—A record is made of the occurrence of *Cerastium hirsutum* on Monte Mai, north of Salerno.—Adele Lewis Grant.

6114. LITTLE, J. E. Notes on North Herts willows. Jour. Bot. 60: 78–80. 1922.—The author discusses the distribution of some of the willows found in the northern part of Hertfordshire.—Adele Lewis Grant.

6115. LOWE, E. N. Plants of Mississippi. Mississippi Geol. Surv. Bull. 17. 292 p. 1921.—A list is given of the flowering plants and ferns of Mississippi, embodying the results of collections made by members of the Geological Survey staff and others, especially Andrew Allison and Thomas L. Bailey. The list of grasses is taken from the Tracy collection in the Department of Botany of the Mississippi Agricultural and Mechanical College. Mohr's Plant Life of Alabama was used as a basis for this bulletin. While the list is not claimed to be complete, it is felt that the mass of material brought together has added some new light on plant distribution in the central Gulf region.—J. M. Beal.

6116. MERRILL, E. D. An enumeration of Philippine flowering plants. Vol. I. Fasc. 1. P. 1–128. 1922; Fasc. 2. P. 129–240. 1922. (Bur. Sci. Philippine Is. Publ. 18.)—The two parts so far issued cover the Gymnospermae, and the Monocotyledonae from the Pandanaceae to Zingiberaceae (*Amomum*). An attempt is made to summarize present knowledge of the Philippine flora, by accounting for all binomials accredited to it; including all references to Philippine and essential extra-Philippine literature; giving the habitat, occurrence, altitudinal range, and the Philippine and extra-Philippine range of each species; citing specimens when necessary or expedient; and recording all available local names under each species. The work is planned for 3 volumes, to be accompanied by full indices, general introduction, and explanatory data. No new species are described, but in the adjustment of synonymy the following new combinations are made: *Pollinia contorta* (*Pogonatherum contortum* Brongn.), *P. glabrata* (Brongn.) Trin. var. *Elmeri* (*P. monantha* Nees var. *Elmeri* Hack.), *P. viminea* (*Andropogon vimineus* Trin.), *Andropogon fragilis* R. Br. var. *malayanus* (*A. fragilis* Merr., not R. Br.), *Digitaria corymbosa* (*Panicum corymbosum* Roxb.), *D. heterantha* var. *pachyrhachis* (*Panicum heteranthum* Nees & Mey. var. *pachyrhachis* Hack.), *D. sanguinalis* (Linn.) Scop. var. *australis* (? *Panicum australe* Spreng.), *Isachne depauperata* (*I. Benecke* f. *depauperata* Hack.), *Ichnanthus vicinus* (*Panicum vicinum* F. M. Bail.), *Chamaeraphis muricata* (*Andropogon muricatus* Linn. f.), *Dinochloa luconiae* (*Bambusa luconiae* Munro), *Hypolytrum scirpoides* (*Albikia scirpoides* Presl), *Cyperus diffusus* Vahl var. *pubesquama* Kükenth. (*C. pubesquama* Steud.), *Pycnus unioides* (*Cyperus unioides* R. Br.), *Mariscus pennatus* (*Cyperus pennatus* Lam.), *Scirpus Merrillii* Kükenth. (*Schoenoplectus Merrillii* Palla), *Fimbristylis Thouarsii* (*Arthrostylis Thouarsii* Kunth), *Schoenus philippinensis* Kükenth. (*Helothrix philippinensis* Palla), *Cladium crinitum* (*Vincentia crinita* Stapf), *Calamus maximus* Blanco var. *nanga* (*C. Merrillii* var. *nanga* Becc.), *C. maximus* Blanco var. *Merrillianus* (*C. Merrillianus* Becc.), *C. usitatus* Blanco var. *major* (*C. mollis* var. *major* Becc.), *C. usitatus* Blanco var. *palawanicus* (*C. mollis* var.

palawanicus Becc.), *Orania palindan* (Blanco) Merr. var. *sibuyanensis* (*O. philippinensis* Scheff. var. *sibuyanensis* Becc.), *Monochoria vaginalis* (Burm. f.) var. *pauciflora* (*Pontederia pauciflora* Blume), *Kolowratia congesta* (*Alpinia congesta* Elm.), *Amomum dalican* (*Hornstedtia dalican* Elm.), *A. irosinensis* (*H. irosinensis* Elm.), *A. microcheila* (*H. microcheila* Ridl.), *A. philippinense* (*H. philippinensis* Ridl.), *A. pubescens* (*A. lepocarpum* var. *pubescens* Ridl.), and *A. purpureum* (*H. purpurea* Elm.). *Languas* Koenig is adopted as the proper generic name for the oriental species long placed in *Alpinia*, and 30 Philippine species are transferred from *Alpinia* to *Languas*. The genus *Garnotiella* Stapf (Gramineae) is reduced to *Asthenochloa* Büse.—E. D. Merrill.

6117. METCALF, F. P. Notes on marsh and aquatic plants of Missouri. Jour. Washington [D. C.] Acad. Sci. 12: 307-312. 1922.—The results, from the standpoint of distribution, of an extensive survey of the marsh and aquatic plants of Missouri, are here published. Of the 17 plants listed, the following 10 have not previously been reported from the state: *Alisma brevipes* Greene, *Hemicarpha aristulata* (Coville) Smyth, *Naias guadalupensis* (Spreng.) Morong, *Nymphoides peltatum* (S. P. Gmel.) Britten & Rendle, *Paspalum pleniolum* Nash, *Potamogeton crispus* L., *P. Friesii* Rupr., *P. heterophyllum* Schreb., *Ruppia maritima* L., *Rynchospora corniculata* (Lam.) A. Gray.—Helen M. Gilkey.

6118. MILLS, W. H., AND A. H. EVANS. *Cirsium tuberosum* All. in Cambridgeshire. Jour. Bot. 60: 21. 1922.—A new locality is given for *Cirsium tuberosum*. It was found in Cambridgeshire among rough herbage in the south of the County.—Adele Lewis Grant.

6119. MURR, J. Plant notes, etc., for 1921. [*Chenopodium album* L. and its forms.] Rept. Bot. Soc. and Exchange Club British Isles 6: 302-306. 1921 [1922].—The new species *C. Drucei* is included.—G. C. Druce.

6120. PAMMEL, L. H. Notes on Buckingham Lake area. Rept. Iowa State Bd. Conservation 1919: 52-54. 1921.—This is a discussion of the Missouri loess and the common herbaceous plants and trees associated therewith.—L. H. Pammel.

6121. PETCH, T. *Lantana* in Ceylon. Jour. Indian Bot. 2: 302-306. 1921.—*Lantana aculeata* L., introduced into Ceylon about 1824, has become common but is not regarded as a troublesome weed. Rather, it is to be considered as beneficial, as it rapidly invades denuded areas and prevents erosion. *Tithonia diversifolia* Gray, a composite, was introduced in 1851 as a garden plant. It has been reported to kill out *Lantana*, but "Ceylon botanists at the present time would hesitate to affirm" this. The identity of the *Lantanas* in Ceylon is also discussed.—Winfield Dudgeon.

6122. PETERSEN, N. F. Flora of Nebraska. A list of the ferns, conifers and flowering plants of the state with keys for their determination. 3rd ed., 8 vo, 220 p. Published by the author: Lincoln, Nebraska, 1922.—The present edition follows in general the same plan as the previous editions. A number of additions and minor corrections have been made. The most noteworthy change is the extension of the volume to include the ferns and fern allies, of which 27 are recorded from Nebraska.—J. M. Greenman.

6123. RIDLEY, H. N. The flora of Klang Gates. Jour. Federated Malay States Mus. 10: 247-252. 1922.—A list is recorded of 21 species found on the lofty dyke of quartzite rising to 1,400 feet named Klang Gates (because the Klang River descending from the Main Range of the Malay Peninsula, towards K. Lumpur, has cut a gateway through it). The author theorises that a xerophytic element found on the crest is the remains of an ancient xerophytic flora which at one time pervaded the whole of the Malay Peninsula. The 21 plants listed are here enumerated. Most of them are not truly xerophytic, but several are either montane or are found near the sea: *Capparis larutensis* King, *Elaeocarpus Mastersii* King, *Rhodoleia Teysmannii* Miq., *Pygeum Hookerianum* King, *Carallia euryoides* Ridl., *Baeckea frutescens* L.,

Anplectrum divaricatum Triana, *Sonerila prostrata* Ridl., *Aleisanthia rupestris* Ridl., *Embelia coriacea* Wall., *Vaccinium eburneum* Ridl., *Rhododendron longiflorum* Lindl., *Fagraea auriculata* Jack., *Didymocarpus primulinus* Ridl., *Trema angustifolium* Bl., *Ficus indica* L., *F. diversifolia* Bl., *Choriophyllum malayanum* Benth., *Eriachne pallescens* Br., *Eulalia Mili-sumi* Ridl., *Cibotium Barometz* Link.—I. H. Burkill.

6124. RIDLEY, HENRY N. *The flora of the Malay Peninsula*. 8vo. Vol. I. Polypetalae. xxv + 918 p., 75 fig. L. Reeve & Co., Ltd.: London, 1922.—The territory covered by this flora is essentially that part of the Malay Peninsula between 1° and 7° N., including the adjacent islands, an area approximating 52,820 square miles. The author gives in the introduction pertinent information relative to climate, rainfall, geology, botanical areas of the region, a brief statement on distribution of plants, names of places, native names and uses of plants, a list of botanists and plant collectors in the Malay Peninsula, and finally references to important literature. The entire work is planned to be encompassed in 5 volumes. The 1st volume includes the families Ranunculaceae to Cornaceae, arranged essentially in the sequence of Bentham and Hooker's *Genera Plantarum*. The keys are clear and concise, and the bibliography and synonymy are limited. A statement concerning the habitat and geographical distribution accompanies the ample description of each species. The following apparently new species, varieties, and combinations are included: *Cyathostemma virianthorum* Griff. var. *Scortechinii* (C. *Scortechinii* King), *Drepananthus carinatus*, *Canarium latifolium* Pierre, *Polyalthia chrysotricha*, P. *Wrayi* (Unona *Wrayi* Hemsl.), *Popowia nervosa* (*Ellipeia nervosa* Hook. f.), P. *pumila* (E. *pumila* King), *Alphonsea Maingayi* Hook. f. var. *elliptica* (A. *elliptica* Hook. f.), *Barclaya Kunstleri* (B. *Motleyana* var. *Kunstleri* King), *Capparis perakensis* (C. *pubiflora* var. *perakensis* King), *Pittosporum reticosum*, *Polygala monticola* Ridl. var. *major*, *Hydnocarpus nana* King var. *pubescens*, *Garcinia lanceolata*, G. *Curtisii*, G. *montana*, G. *Gaudichaudii* Planch. & Triana var. *minor*, *Calophyllum lanceola*, *Ternstroemia Wallichiana* (*Erythrochiton Wallichianum* Griff.), *Eurya monticola* (E. *acuminata* var. *monticola* Ridl.), *Dipterocarpus Skinneri* King var. *hirtus*, *Anisoptera laevis*, *Shorea palustris*, S. *crassifolia*, S. *laevis*, S. *globifera*, *Pachychlamys Thiseltoni* (*Shorea Thiseltoni* King), P. *Hemsleyanus* (*Balanocarpus Hemsleyanus* King), *Hopea nutans*, H. *pubescens*, *Synaptea Maingayi* (*Vatica Maingayi* Dyer), S. *Louii* (V. *Louii* King), S. *lancaviensis* (V. *lancaviensis* Ridl.), S. *nitens* (V. *nitens* King), S. *perakensis* (V. *perakensis* King), S. *cinerea* (V. *cinerea* King), S. *reticulata* (V. *reticulata* King), *Vatica Scortechinii* (*Retinodendron Scortechinii* King), *Balanocarpus pubescens*, *Urena lobata* L. var. *tomentosa* (U. *tomentosa* Bl.), *Bombax insularis*, B. *larutensis* (B. *insigne* var. *larutensis* Prain), *Durio macrophyllum* (D. *testitudinarum* var. *macrophyllum* King), D. *pinangianus* (D. *testitudinarum* var. *pinangiana* Becc.), *Sterculia rubiginosa* Vent var. *ensifolia* (S. *ensifolia* Masters), *Erythropsis fulgens* (*Sterculia fulgens* Wall.), *Pentace hirtula*, P. *acuta*, *Trichospermum cymbiforme* Sprague, *Sloanea javanica* (*Phoenixosperma javanica* Miq.), *Elaeocarpus acmosepalus* Stapf, E. *rugosus* Roxb. var. *singaporensis*, E. *robustus* Roxb. var. *ovalis*, E. *macrocarpa*, *Brachylophon Curtisii* Oliv. var. *Hullettii* (B. *Hullettii* King), *Connaropsis simplicifolia*, *Hydrocera angustifolia* Bl. var. *latifolia* (H. *triflora* Wight & Arn.), *Evodia malayana* (E. *Roxburghiana* Hook. fil., in part), *Citrus malaccensis*, *Gomphia microphylla*, *Canarium pilosum* Benn. var. *hirtellum* (C. *hirtellum* Benn.), *Turraea breviflora*, *Megaphyllaea annulata*, *Dysoxylum cauliflorum* Hiern var. *elongatum* (D. *cuneatum* Hiern), D. *macrothyrsus* Miq. var. *microbotrys* (D. *microbotrys* King), D. *alternatum*, *Chailletia sordida* (C. *deflexifolia* var. *sordida* Hook. f.), *Gomphandra ophirensis* (*Lasiandra lanceolata* Masters, not G. *lanceolata* King), G. *lanceolata* King var. *ovalifolia*, G. *Maingayi* King var. *pubescens* (G. *puberula* Ridl.), G. *gracilis* King var. *gracillima*, *Phytocrene trichura*, *Cantleya* n. gen. doubtfully placed in Olacaceae, C. *johorica*, *Ilex triflora* Bl. var. *longifolia*, *Lophopetalum pallidum* Lawson var. *Curtisii* (L. *Curtisii* King), L. *coriacea* (*Kokoonia coriacea* King), L. *Maingayi* (K. *Scortechinii* King), L. *littoralis* (K. *littoralis* King), *Salacia prinoidea* DC. var. *macrophylla* King (S. *macrophylla* Bl.), *Zizyphus pernettiioides*, *Ventilago velutina*, *Vitis Harmandi* (*Ampelocissus Harmandi* Planch.), *Otopora Hullettii* (*Cipura Hullettii* Ridl.), *Nephelium glabrum* Noronh. var. *sufferrugineum* (N. *sufferrugineum* Radlk.), N. *caudifolium*, N. *setosum* (*Euphoria setosa* Radlk.), *Mischocarpus Lessertianus* (*Cupania*

Lessertiana Camb.), *Meliosma elegans*, *Buchanania lucida* Bl. var. *laxiflora*, *Melanorrhoea pubescens*, *Spatholobus ferrugineus* Benth. var. *sericophyllus*, *Erythrina suberosa* var. *horrida*. *E. rostrata*, *Pongamia glabra* Vent. vars. *typica* and *aerocarpa*, *Derris elegans* Benth. vars. *typica* and *vestita* Prain, *D. amoena* Benth. vars. *typica* and *Maingayana* Prain (*D. Main. gayana* Baker), *Desmodium polycarpum* DC. var. *albiflorum*, *Dialium platysepalum* Baker var. *ambiguum* (*D. ambiguum* Prain), *Polyosma laete-virens* Griff. var. *robusta*, *Corallia euryoides*, *Combretum chinense* Roxb. vars. *Porterianum* and *pubescens*, *Quisqualis densiflora* Wall. var. *parvifolia*, *Leptospermum flavescens* Sm. var. *angustifolia*, *Rhodamnia cinerea* Jack var. *caudata*, *Eugenia trunciflora* (*E. cauliflora* Ridl., not Bergius), *E. densiflora* Duthie var. *angustifolia*, *E. subrufa* King var. *robusta*, *E. alata*, *E. pseudo-subtilis* King var. *subacuminata*, *E. pallidula*, *E. verecunda* Duthie var. *major*, *E. inophylla* Roxb. var. *Bernardi* (*E. Bernardi* King), *E. Prainiana* King var. *Pearsoniania* (*E. Pearsoiana* King), *Melastoma polyanthum* Bl. var. *angustifolia*, *M. normale* Don var. *glabrescens*, *M. perakense* (*M. malabathricum* var. *perakense* King), *Oxyspora floribunda* (*Anerincleistus floribundus* King), *O. collina* (*A. collinus* Ridl.), *O. hirticalyx* (*Allomorphia hirticalyx* Ridl.), *Allomorphia exigua* Bl. var. *capillaris* (*A. capillaris* Ridl.), *Oritrephes Barnesii* (*Anerincleistus Barnesii* Ridl.), *O. grandiflora* (*A. grandiflora* Ridl.), *O. albiflora* (*A. albiflora* Ridl.), *O. Robinsonii* (*A. Robinsonii* Ridl.), *Perillimnastes* n. gen. of Melastomaceae, *P. fruticosa* (*Anerincleistus fruticosus* Ridl.), *Sonerila prostrata*, *S. picta* Korth. vars. *concolor* and *maculata* (*S. flaccida* Stapf), *Marumia nemorosa* Bl. var. *verrucosa* (*M. verrucosa* Cogn.), *Plethiandra sessiliflora* (*Medinillopsis sessiliflora* Cogn.), *Pternandra Jackiana* (*P. coerulescens* var. *Jackiana* Clarke), *P. galeata* (*Kibessia galeata* Cogn.), *P. echinata* Jack var. *bracteata*, *Memecylon tenuifolium*, *M. dichotomum* Clarke var. *eugeniiflorum* (*M. eugeniiflorum* Ridl.), *Casearia flexula* (*C. flexuosa* Ridl., not Craib), *C. Clarkei* King var. *Kunstleri* (*C. Kunstleri* King), *Trichosanthes tricuspidata* Lour. var. *penangensis*, *Begonia Hasskarli* Zoll. & Mor. var. *hirsuta*, *B. Scortechinii* King var. *Kunstleriana* (*B. Kunstleriana* King), *B. Herveyana* King var. *robusta*, *Schefflera lurida* (*Heptapleurum luridum* King), *S. tristis* (*H. triste* King), *S. elegans* (*H. elegans* Ridl.), *S. venulosa* Harms var. *Curtisii*, *S. Curtisii* (*H. Curtisii* King), *S. micrantha* (*Paratropia micrantha* Miq.), *Trevesia rufo-setosa*, *Dendropanax lancifolium* (*Arthrophyllum lancifolium* Ridl.), and *Mastiria megacarpa*.—J. M. Greenman.

6125. RYDBERG, PER AXEL. Notes on Rosaceae-XIV. Bull. Torrey Bot. Club 50: 61-71. 1923.—A discussion is given of the roses of the prairies and plains of the U. S. A. with key to each group and distribution of the species, of which 25 are recognized for this area.—P. A. Munz.

6126. SCHAFFNER, J. H. Additions to the catalog of Ohio vascular plants for 1922. Ohio Jour. Sci. 23: 107-114. 1923.—The list of additions includes 3 pteridophytes, 2 gymnosperms, and 67 angiosperms. A corrected list of 11 Ohio species of *Equisetum* is inserted.—H. D. Hooker, Jr.

6127. SMALL, JOHN K. Along the Juniata River. Jour. New York Bot. Gard. 22: 168-171. 1921.—A record is given of field observations on the flora of the region indicated in the title.—H. A. Gleason.

6128. STEPHENSON, T., AND T. A. STEPHENSON. Plant notes, etc., for 1920. [Epipactis.] Rept. Bot. Soc. and Exchange Club British Isles 6: 44-46. 1920 [1921].—A synopsis of the British forms of *Epipactis* is given.—G. C. Druce.

6129. STEPHENSON, T., AND T. A. STEPHENSON. Plant notes, etc., for 1921. [Orchis purpurella Steph. and its hybrids.] Rept. Bot. Soc. and Exchange Club British Isles 6: 311-314. 1921 [1922].

6130. TADGELL, A. J. A contribution to "The flora of the Victorian Alps." Victorian Nat. 38: 105-118. 1922.—The author adds to a previous paper by A. J. Ewart (Victorian Nat. 27: 104-117. 1910) 83 species of native plants, with 17 varieties and 11 aliens additional. A supplementary note gives 11 natives, 2 varieties, and 26 aliens more, making a total of 476 plants recognized in the district.—*Wm. Randolph Taylor*.

6131. YUNCKER, T. G. A species of *Cuscuta* not hitherto reported from Indiana. Proc. Indiana Acad. Sci. 1920: 229. 1921.—Two localities, Vigo and Posey Counties, for *Cuscuta cuspidata* Englm. are reported for the state of Indiana. This species is typical of the prairie region of the Mississippi River westward.—*F. C. Anderson*.

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12

NOVEMBER, 1923

No. 9

ENTRIES 6132-6737

AGRONOMY

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(See also in this issue Entries 6242, 6357, 6465, 6527, 6585, 6594, 6638, 6639, 6645)

6132. ANONYMOUS. Number of seeds per unit weight. Seed World 11²: 22. 1922.—A standard table is presented indicating the number of seed per unit weight for certain kinds of field seeds; it has been adopted by the Association of Official Seed Analysts of North America.—*M. T. Munn.*

6133. ANONYMOUS. State seed testing methods in Denmark. Seed World 10⁴: 23-24. 1921.—A report is presented on the history and work of the Danish State seed testing station. Laboratory methods used in making purity and germination tests are described.—*M. T. Munn.*

6134. ANONYMOUS. Vitality of Lespedeza seed limited. Seed World 11³: 44. 1922.—Well-matured seed give a high percentage of germination when fresh, but the germination decreases rapidly when the seed are kept over. Only a few seed live over the 3rd year.—*M. T. Munn.*

6135. ANONYMOUS. Wimmera rye grass: What it is and where it should be used. Seed World 12³: 24. 1922.—Wimmera rye grass (*Lolium subulatum*) is a drought-resistant form of the biennial Italian rye grass. Like Italian rye grass, the Wimmera variety is an annual and the seed is somewhat similar in form, although minus the awns.—*M. T. Munn.*

6136. BARROW, E. H. Cane varieties at Guanica. Facts about Sugar 15: 500. 1922.—Desirable and undesirable qualities of the most important varieties are recounted.—*C. W. Edgerton.*

6137. BJERG-JENSEN, J. C. A new variety of Danish white clover. Seed World 11⁷: 19. 1922.—The new variety is the Mors white clover.—*M. T. Munn.*

6138. B[ROOKS], C. F. The critical period of wheat at College Park, Md. [Rev. of: SANDO, W. J. The critical period of wheat at College Park, Md. Monthly Weather Rev. 49: 301. 1921.] Bull. Amer. Meteorol. Soc. 2: 84. 1921.—“In eastern Maryland it was found that high yields of wheat occurred in the drier years and vice versa, especially when the rainfall for the 35-50 days before harvest was small.”—*Earl S. Johnston.*

6139. BROWN, E. **Labeling of field seeds by seedsmen.** Proc. Assoc. Official Seed Analysts North America 1919: 27-28. 1921.—In 1919, after an understanding whereby the seed trade voluntarily agreed to label all farm crop seeds with certain information, purchases made indicated that only 10 per cent of the lots of seed so purchased by the U. S. Department of Agriculture for this purpose were fully labeled. Later purchases disclosed an even smaller proportion of the lots fully labeled. It is concluded that any reform must be secured through other means than voluntary agreement.—*M. T. Munn.*

6140. BUSSE. **Tagesfragen aus dem deutschen und ausländischen Tabakbau.** [Present day questions regarding German and foreign tobacco culture.] Mitteil. Deutsch. Landw. Ges. 38: 241-244. 1923.—In this address before the Colonial Section of the German Agricultural Society the speaker called attention to the possibilities of expanding tobacco culture in Germany. Special mention is made of the introduction of American varieties. The work of Garner and Allard is referred to as helpful in selecting varieties that will succeed under German conditions.—*A. J. Pieters.*

6141. CHAMBERLAIN, JAMES F. **Relationship between weather and crops.** Bull. Amer. Meteorol. Soc. 2: 67-68. 1921.—The probable frequency of early and late frosts has been studied and although weather cannot be controlled, agriculturists and shippers can carry on their work by following weather forecasts in such a manner that crop losses may be reduced to a minimum.—*Earl S. Johnston.*

6142. CLAUS, G. **Grundlagen und Aufgaben einer modernen deutschen Saatzuchtwirtschaft.** [Foundations and tasks of a modern German seed breeding establishment.] Mitteil. Deutsch. Landw. Ges. 38: 293-298. 1923.—In this address before the seed breeding section of the German Agricultural Society the speaker outlined the weather and soil requirements for successful seed culture; the organization and physical plant, including machinery; the technical demands and especially the point of view made possible by recent advances in knowledge of heredity.—*A. J. Pieters.*

6143. COLON, E. D., AND A. M. DE ANDINO. **Cane varieties in northern Porto Rico.** Facts about Sugar 16: 32-33. 1923.—The several varieties grown are discussed.—*C. W. Edgerton.*

6144. CUNNINGHAM, BYRSSON. **Indian irrigation.** [Rev. of: Triennial review of irrigation in India, 1918-1921. v + 222 p. Government Printing Office: Calcutta, 1922.] Nature 111: 388-389. 1923.—In 1919-20, there were under irrigation in India 28 million acres, with 55,202 miles of Government channel in operation.—*O. A. Stevens.*

6145. DAHLBERG, R. C. **The identity of certain sweet clover seed.** Proc. Assoc. Official Seed Analysts North America 1919: 25. 1921.—Some of the seed of yellow sweet clover (*Melilotus officinalis*) are sufficiently similar to those of white sweet clover (*M. alba*) to make complete separation of the 2 species impossible. There are, however, seed of yellow sweet clover which are spotted with small splotches of purple of unequal size and degree of color. Seeds so marked can definitely be assigned to *M. officinalis*.—*M. T. Munn.*

6146. DORPH-PETERSEN, K. **Meddelelse om forskellige Undersøgelser ved Stratsfrøkontrollen i København.** [Communication on investigations at the state seed testing station in Copenhagen.] Nordisk Jordbrugsforskning 1922: 429-441. 2 fig. 1922.—The speed of germination is important since a small difference in this respect between 2 samples will be reflected in a considerably lower percentage of germination, both in the laboratory and in the field. Shelled seed of timothy (*Phleum pratense*) have generally only $\frac{3}{4}$ of the germinating value of seed with glumes, and lose their germinating power much more rapidly. The shelled seed of cocksfoot grass (*Dactylis glomerata*), oats, and tall oat-grass (*Arrhenatherum elatius*) are also inferior, although not to such an extent as in timothy.—*Ernst Gram.*

6147. DYMOND, J. R. **Colour characteristics of red clover seed.** Proc. Assoc. Official Seed Analysts North America 1920: 30-32. 1921.—The author's results indicate that in red clover seed harvested in Ontario in 1916 the purple colored seed were slightly more prevalent and in practically every case weighed more per thousand seed than the yellow. Germination tests made 32 months after harvest show that the yellow seed give a higher percentage of germination and contain more hard seed than the purple. The green or immature seed give the lowest percentage of germination but contain a surprisingly high proportion of hard or impermeable seed. The brown seed are shown to be low in vitality and to contain the smallest percentage of hard seed.—*M. T. Munn.*

6148. EASTERBY, H. T. **Bureau of Sugar Experiment Stations. From: Annual report of the director. II.** Australian Sugar Jour. 15: 43-46. 1923.—At the Mackey Experiment Station subsoiling in comparison with the customary cultivation using Green Goru (N. G. 24 B) as the cane crop showed that subsoiling increased the crop. The tabular results are given of trials made with varieties of imported cane to test their commercial values. The dates for arrowing of different varieties of cane growing at the Mackey Station are given in a table.—*C. Rumbold.*

6149. EGGINGTON, GEO. **Irrigation water as a factor in the dissemination of weed seeds.** Proc. Assoc. Official Seed Analysts North America 1919: 20-21. 1921. [See Bot. Absts. 8, Entry 1594.]

6150. EVANS, E. E. **"Canada Peas" grown 100 B. C.** Seed World 94: 30. 1921.—Many varieties of peas that are called "Canadian" have been grown in Manchuria for more than 2,000 years and in the U. S. A. since the time of the Pilgrims.—*M. T. Munn.*

6151. FRENCH, G. T. **The effect of commercial blue blotting paper on the germination of timothy seed.** Proc. Assoc. Official Seed Analysts North America 1920: 55-56. 1921.—Tests reported indicate that the commercial grade of blotting paper is not reliable for germinating timothy and redtop seeds. The behavior of seed on such paper cannot be depended upon to show their state of vigor. Seeds of timothy and redtop show sprouts but no roots upon such paper. Only paper should be used which has been found reliable by comparative tests with paper known to be free from these toxic substances. A chemical analysis of the paper does not appear to be a reliable guide.—*M. T. Munn.*

6152. FROBERVILLE, L. F. DE. **Degeneration of Uba cane.** South African Sugar Jour. 7: 303-305. 1923.—There can be no degeneration of Uba cane in Africa since the cane is always propagated by cuttings, not by seed. Poor cane can be accounted for by lack of cultivation and plant food. Seed-cane should be carefully selected or canes may be imported from other regions in Africa. Manure and lime should be used, and trash should not be burned before harvesting. Legumes should be cultivated in cane fields, and crops rotated.—*C. Rumbold.*

6153. FUENTE, CARLOS CASADO DE LA. **Ueber günstige Wirkung von Gips auf Keimlinge der landwirtschaftlichen Kulturpflanzen.** [On the favorable effect of gypsum on seedlings of agricultural plants.] Illus. Landw. Zeitg. 42: 340. 1922.—This report of pot experiments shows increased growth of maize and lucerne due to the use of gypsum. It is concluded that acid soils should, if practicable, first be treated with calcium carbonate or with quick-lime to neutralize acids. Gypsum should then be used for promoting the development of the young plants.—*John W. Roberts.*

6154. GARMAN, II. **Germination of scarified hard seeds.** Seed World 123: 15; 129: 19. 1922.—The author describes a laboratory scarifier constructed for use on hard seeds of legumes. A table shows a gain of 11.2 per cent in total germination as a result of scarifying 10 minutes in this car with its boxes lined with sandpaper, and 15.8 per cent from treating 20 minutes.—*M. T. Munn.*

6155. GARMAN, H. **Kentucky blue grass seed crop.** Seed World 13⁶: 20-21; 13⁸: 18-19. 1923.—In this discussion of the Kentucky blue grass industry the 1st article deals principally with seed production and the 2nd mainly with purity and germination testing methods.—*M. T. Munn.*

6156. GARMAN, H. **The effect of paradichlorobenzene on the vitality of stored seeds.** Seed World 11⁴: 19-20. 1922.—Tests made imply that seed can be protected by paradichlorobenzene where they are kept rather closely confined, and loss of viability, if any, is slow and very slight. This fumigant stops injury in seed already infested with insects. It was not determined whether the fumigant would leave odor or flavor on seed to be used for food.—*M. T. Munn.*

6157. GERLACH. **Beiträge zur Kenntnis der Wirkung einer Phosphorsäuredüngung.** [Contribution to a knowledge of the effect of fertilizing with phosphoric acid.] Mitteil. Deutsch. Landw. Ges. 38: 259-264. 1923.—The author reviews the arguments of those who advocate a reduced use of phosphoric acid. On a farm on which 26 kgm. phosphoric acid in excess of that removed by crops had been applied per hectare each year from 1870 to 1912, the application in 1922 of superphosphate and Thomas meal resulted in marked increases in the yield of potatoes. The results of phosphoric acid fertilizer tests on potatoes, barley, winter-wheat, and meadows, carried on by a large number of coöperators, are given in tabular form.—*A. J. Pieters.*

6158. GERLACH. **Die Gewinnung von Eiweiss im Inlande.** [Domestic production of protein.] Mitteil. Deutsch. Landw. Ges. 38: 352-355. 1923.—Attention is called to the great decrease in protein-rich feeds and human food in Germany. A decrease is shown in the yield per unit area and in the areas planted, and the following remedial measures are suggested: (1) increase in area cultivated; (2) fertilizing grain-bearing legumes, clovers, meadows, and pastures with nitrogen; (3) better methods of conservation, especially for protein-rich green fodder plants; (4) feeding urea. There is a general discussion under each head. In regard to urea it appears that experiments have not been uniformly favorable and that the high cost makes its use at this time questionable.—*A. J. Pieters.*

6159. GLOYER, W. O. **Sclerema and hardshell, two types of hardness of the bean.** Proc. Assoc. Official Seed Analysts North America 1920: 60. 1921.—The 2 distinct types are: hardness of the interior, to which the name sclerema is given; and hardening of the seed coat, which is termed hardshell. The former results from enzymatic changes produced by storing the seed in damp atmosphere and at a high temperature in the absence of ventilation. The latter is a physical condition produced by storing seed in an artificially heated room with a low relative humidity. Beans ripened in hot, dry weather also acquire this condition in the field. The seasonal variation of the germination of the red kidney and lima beans is due to changes in the impermeability of the seed coat. Mature as well as immature beans develop the hardshell condition, which may be corrected by plunging the seed for 5 seconds in boiling water followed by immersion in cold water, or by exposing the seed to flowing steam.—*M. T. Munn.*

6160. HENKE, L. A. **Cane varieties in Hawaii.** Facts about Sugar 15: 320-321. 1922.—The history and characteristics of the principal sugar cane varieties grown in Hawaii are treated.—*C. W. Edgerton.*

6161. HILLMAN, F. H., AND HELEN H. HENRY. **The identification of seed of Italian alfalfa and red clover.** Proc. Assoc. Official Seed Analysts North America 1919: 24-25. 1921. [See also Bot. Absts. 5, Entry 27.]

6162. HOPKINS, C. G., J. E. WHITCHURCH, H. F. T. FAHRNKOPF, AND F. H. KELLEY. **Yields from ten wheat fields in "Egypt."** Illinois Agric. Exp. Sta. Circ. 236. 1 p. 1919.—The results are given of soil fertility tests on wheat, *Triticum sativum*, grown on 10 experimental fields in the southern part of Illinois.—*O. H. Sears.*

6163. HOPKINS, ELIZABETH F., AND M. T. MUNN. **Variations in seed tests—application of the tolerance formula.** Proc. Assoc. Official Seed Analysts North America 1920: 62-63. 1920. Also, *Seed World* 9: 23-24. 1921.

6164. HORNADAY, W. D. **Results of paper covering of cane.** *Sugar* 24: 249-250. 1922.—Covering cane fields with a specially made paper conserves moisture, prevents packing of the soil, reduces labor, and considerably increases the yield.—C. W. Edgerton.

6165. HUGHES, H. D. **Comparative germination of seeds sampled by hand and by the pneumatic seed counter.** Proc. Assoc. Official Seed Analysts North America 1919: 13-14. 1921.—Data are presented to show that the mechanical seed counter or sampler is a time saver, the personal element is eliminated, and that this method of taking samples of 100 seed for germination testing is accurate.—M. T. Munn.

6166. JONES, J. M., AND R. E. DICKSON. **Grain sorghums versus corn for fattening lambs.** *Texas Agric. Exp. Sta. Bull.* 306. 32 p. 1923.—All west Texas grows more or less of the grain sorghums, while corn is often a failure because of lack of rain. The experiment shows that ground threshed Milo and Kafir produce practically the same gains as ground shelled corn when fed to lambs in the same amounts. There is little difference in the value of milo and kafir. As the sorghums are cheaper than the corn, the cost is 10-17½ per cent less than corn. The Kansas Experiment Station has carried out similar tests which substantiate the results in this report.—L. Pace.

6167. JONES, JENNIE SALES. **Two methods of testing hairy vetch seed for purity.** Proc. Assoc. Official Seed Analysts North America 1920: 60-62. 1921.—Two methods, designated as the Count and the Weight methods were used in an attempt to determine which would give the smaller number of variations. The author is inclined to use the weight method for the present.—M. T. Munn.

6168. KENNEDY, P. B. **Observations on some rice weeds in California.** *California Agric. Exp. Sta. Bull.* 356. 467-494. 1923.—Flooding in summer to germinate the seeds and then plowing under the young seedlings is one of the most effective methods of cleaning foul rice lands. Repeating the flooding and then disking should also be very effective. Controlling water grass by the submergence method is gaining many adherents. Water grass does not come up through 8 inches of water, whereas rice will. Controlling water grass by rotating rice with some other crop, especially a legume, would be an ideal method but as yet the drainage or soil conditions required to grow other crops successfully have not yet been realized. On some of the better lands, not typical rice lands, grain or sorghum will produce good crops in a rotation. Hand weeding is effective but expensive. The use of clean seed rice is an effective method of control. A list of 34 rice weeds, and a discussion of the nature of their growth is given.—A. R. C. Haas.

6169. KLAUTKE, P. **Nutzpflanzen und Nutztiere Chinas.** [Economic plants and economic animals of China.] 159 p., illus. *Weltwirtschaftliche Abhandlungen*, edited by S. BERLINER. Band 5. Hanover, 1922.—Plant geography is discussed in the introduction; and in the various chapters the following are discussed. Field crops: grains, sorghum, millet, wheat, barley, rye, oats, maize, rice. Oil seeds: sesame, beans, rape, peanuts. Fiber plants: cotton, China grass, hemp, jute, flax, Abutilon hemp or Sida hemp. Vegetables: potatoes, sweet potatoes, yams, eggplants, turnips, kohlrabi, taro, cabbage, cucumbers and melons, onions, lotus. Orchard crops: orange, peach, apricot, plum, cherry, pear, apple, medlar, persimmon, lichi, pineapple, berries, grapes, walnuts. Important plant products: tea, opium, sugar, tobacco, varnish, green vegetable tallow, cassia, gallnut, rhubarb, ginger, indigo, shellac, camphor, fiber lace, matting, Ningpo hats, palm-leaf fans, anise, bamboo. Animal industry, the silk industry from cultivated and wild silk, white (insect) wax, and Chinese flower gardens are also covered. There is a general review of the fauna of China, and a bibliography.—W. B. Lydenberg.

6170. KRAMER. Die Zuckerrübenstandweitenversuche des Jahres 1922. [The sugar beet-spacing investigations in 1922.] Mitteil. Deutsch. Landw. Ges. 38: 179-180. 1922.—The drills were spaced 40, 50 and 60 cm. Out of 42 tests, the 40-cm. spacing gave the highest yield in 40.5 per cent of the cases, the 50-cm. spacing in 52.4 per cent, and the 60-cm. spacing in 7.1 per cent. The sugar production per hectare was found highest in 50 per cent of the cases for 40-cm. spacing, in 47.5 per cent for 50-cm., and in 2.5 per cent for 60-cm. spacing.—A. J. Pieters.

6171. KRON, OSKAR. Zum Düngungsversuche mit heissvergorenem Stallmist. Manuring experiments with hot-fermented stable manure.] Mitteil. Deutsch. Landw. Ges. 38: 380-384. 1923.—On field A potatoes were grown in 1921 and wheat in 1922; on field B potatoes were grown in 1922. The results are given in detail in 2 tables and confirm the report previously made that hot-fermented stable manure and green manure produce higher yields than does yard manure.—A. J. Pieters.

6172. LEONHARDS. Neuerscheinungen auf dem Düngemittelmarkt. [Recent appearances in the fertilizer market.] Mitteil. Deutsch. Landw. Ges. 38: 398-400. 1923.—The author refers by trade name to a number of new fertilizers and gives results of tests or of analyses. Most of these preparations were found to be without value; a few have not been sufficiently tested to warrant a positive statement but their value seems doubtful. Many of the preparations mentioned were of the humus type designed to increase the bacterial life of the soils, such as Biohumus.—A. J. Pieters.

6173. LÖBBECKE, VON. Ist es bei der Missernte an guter Leinsaat möglich und ratsam die Ansaat stärker herabzusetzen? [Is it possible and advisable, in case of a poor harvest of flax seed, to sow greatly reduced amounts?] Mitteil. Deutsch. Landw. Ges. 38: 143-144. 1923.—The writer's personal experience was that good results could be had with seeding 30 pounds per morgen provided the seed was drilled in carefully prepared land.—A. J. Pieters.

6174. LUNZ, H. Shall impermeable seeds be counted as part of the germination test. Proc. Assoc. Official Seed Analysts North America 1920: 67-70. 1920. Also, Seed World 9: 21-22. 1921.

6175. McCONNIE, R. C. Cane cultivation at Fajardo. Facts about Sugar 15: 440-441. 1922.—Methods of cultivation are discussed, including lining, plowing, ditching, planting, fertilizing, and harvesting.—C. W. Edgerton.

6176. MEYER, D. Düngungsversuche mit Stickstoff zu Schmetterlingsblütlern. [Fertilizer experiments with nitrogen on legumes.] Mitteil. Deutsch. Landw. Ges. 38: 180-182. 1923.—The trials with red clover showed a slight increase in yields, but no increase in protein content. Those with luzerne showed a fair increase in yield for the 1st cutting but not for the 2nd and a very slight increase in the protein content. The trials with lupines showed no increases whatever.—A. J. Pieters.

6177. MILLIGAN, S. Review of sugar cane agricultural operations in India, 1921-1922. From: Annual review of agricultural operations in India issued by the agricultural adviser to the government of India. Pusa [January, 1923]. Internat. Sugar Jour. 25: 242-246. 1 map. 1923.—An account is given of the successful trials on a field scale of the seedling sugar canes bred at the Sugar Cane Station at Coimbatore. Co 205, Co 210, Co 213, Co 214, and some others are very promising. Some of their characteristics are described.—C. Rumbold.

6178. MUNN, M. T. The nature and cause of the "water sprout" encountered in germination testing. Proc. Assoc. Official Seed Analysts North America 1920: 54. 1921.—The so-called "water sprout" which may be found on germinating seeds of many kinds, especially prevalent and conspicuous on the legumes, is not a normal growth process but occurs on dead

or greatly weakened seeds. The exciting causes of the "water sprout" in many cases appear to be bacteria and fungi of one or more species which have been stimulated to activity by placing infested seed under conditions of moisture and heat in the process of germination.—*M. T. Munn.*

6179. NAIK, KASANJI D. Report of the Secretary, Sugar Bureau (India). Sci. Rept. Agric. Res. Inst. Pusa 1921-22: 88-96. 1922.—The Bureau has propagated and tested promising varieties of Java, Coimbatore (South India), and local sugar cane in North Bihar. Statistical information and advice about machinery and mills have been supplied to manufacturers.—*Winfield Dudgeon.*

6180. NICHOLSON, G. Field experiments with wheat, Wagga experiment farm. Agric. Gaz. New South Wales 34: 322-325. 1923.—There were 17 wheat varieties under trial grown on fallow for grain. Wandilla yielded highest at 32 bushels per acre. Three of these varieties and 2 others were under trial for hay production.—*L. R. Waldron.*

6181. NOLTE, O. Die Düngung landwirtschaftlicher Kulturpflanzen mit Schwefel. [Fertilizing agricultural plants with sulphur.] Mitteil. Deutsch. Landw. Ges. 38: 248-249. 1923.—Pot or field tests were made at 7 stations using lucerne, orchard grass, rye grass, red clover, white clover, and potatoes as indicator crops. Various soil types were used. No notable increases were found with lucerne or potatoes. In the 1 test reported red and white clover showed some, and orchard grass and rye grass, slight increases. Details are given in tables and in 1 case analyses are given of the crops variously fertilized.—*A. J. Pieters.*

6182. PAGE, R. L. Uba cane in Porto Rico. Facts about Sugar 15: 420-421. 1922.—Uba cane was introduced into Porto Rico on account of its resistance to the mosaic disease. It is also a very heavy yielding cane and will probably become firmly established in spite of its small size and high cost of harvesting.—*C. W. Edgerton.*

6183. PIETERS, A. J. Red clover seed consumption in the United States. Seed World 13: 13-14. 1923.—On the basis of the wheat acreage for 1921-22 and data regarding the percentage of wheat acreage seeded to clover, the author estimates the total annual consumption of clover seed in the U. S. A. at 120-130 million pounds, of which 85-92 million pounds is red clover seed.—*A. J. Pieters.*

6184. ROEMER, TH. Anbau und Züchtung der Lupine. [Culture and breeding of lupines.] Mitteil. Deutsch. Landw. Ges. 38: 168-169. 1923.—The writer calls attention to some difficulties attending culture and breeding of lupines.—*A. J. Pieters.*

6185. SAUNDERS, C. B. Fifth annual report, Official Seed Testing Station for England and Wales. Jour. Nation. Inst. Agric. Bot. 1: 24-35. 1922.—A steady growth over the work done in previous years was made. Now a part of the National Institute of Agricultural Botany, the Station has commodious and well equipped quarters and the advantage of close contact with the plant breeding work of the Institute. Tables show the number of tests made of the different kinds of seed, the average results of the tests and the source from which the samples were received. Approximately 10 samples were received from seedsmen for each sample received from farmers. At the beginning of the year the method of testing grass seed was changed from the so-called Irish method to the Continental method. A short course in seed testing was given during the summer.—*E. Brown.*

6186. SCHEUMANN, GEORG. Die Gewinnung von Eiweiss für Futterzwecke und die menschliche Ernährung nach dem Pohlschen Verfahren. [Securing albumin for feed and for human consumption by the method of Pohl.] Mitteil. Deutsch. Landw. Ges. 38: 271-292. 1923.—The speaker called attention to the method patented by Pohl according to which lupine seed is extracted with a salt solution from which the albumin is then precipitated by

appropriate reagents. The product is a whitish yellow powder containing 98-99 per cent pure albumin. Bread made from $\frac{3}{4}$ rye or wheat flour plus $\frac{1}{4}$ lupine meal tastes like good rye bread and has a much higher protein content. This lupine albumin can also be used in many technical industries as in cotton manufacture and in the preparation of photographic plates, films, etc. The ground and extracted lupine seed still contain a large amount of protein and can be mixed with molasses to make a high grade cake. Analysis of the extracted residue is given.—*A. J. Pieters.*

6187. SCHNEIDER, KARL. Die Bewirtschaftung der Wiesen und Weiden unter Berücksichtigung der wirtschaftlichen Seite in Bezug auf Viehhaltung und Viehzucht. [The management of meadows and pastures considered economically with respect to cattle keeping and cattle breeding.] Mitteil. Deutsch. Landw. Ges. 38: 254-258. 1923.—In this address emphasis is laid on drainage and the use of fertilizers.—*A. J. Pieters.*

6188. SHEPARD, COLA W. Dry land agriculture in northeastern Wyoming. Bull. Amer. Meteorol. Soc. 2: 125-128. 1921.—A plea is made to solve the problem of obtaining water for agricultural purposes in the Great Plains region, thereby increasing its productivity many fold. The author believes the rainfall, if none were lost, is sufficient to produce crops. The paramount need is a method for conserving soil moisture and, to some extent, controlling evaporation.—*Earl S. Johnston.*

6189. SHEPARD, COLA W. The grasses of the plains. Bull. Amer. Meteorol. Soc. 2: 130-132. 1921.—The author disagrees with Redway in believing that the soil rather than the climate determines whether the vegetation in the Great Plains region be bunch grass or sod.—*Earl S. Johnston.*

6190. SIFTON, H. B. Longevity of the seeds of cereals, clovers, and timothy. Proc. Assoc. Official Seed Analysts North America 1919: 22-24. 1921.—Seeds of spring wheat, oats, timothy, alsike and red cover, stored in cotton sacks or manila envelopes in galvanized iron chests, were used. Tests were made with an alternation of temperature from 20 degrees to 30 degrees C. Practically all the kernels of spring wheat retain their vitality for the first 5 years. Then the weaker ones begin to die and more than 75 per cent of the seed lose their vitality between the ages of 11 and 15 years, about $\frac{1}{2}$ of these dying in their 13th year. The longevity of oat seed was found to be much greater than that of wheat, 40 per cent of the 19-year-old kernels being alive. Timothy seed begins to depreciate in value at once. The germination percentage began to fall rapidly after the 7th year, when it was 84 per cent. By the 12th year it was 11 per cent, and after 17 years the seed was practically all dead. Both alsike and red clover have a larger proportion than wheat of seed that lives over 15 years, but from the standpoint of a practical seedsman their longevity is not nearly so great. After 11 years, wheat on the average still germinated more than 85 per cent, but 11-year-old alsike and red clover germinated less than 40 per cent.—*M. T. Munn.*

6191. SÖRENSEN, S. Grass seed industry in Denmark. Seed World 13¹: 20-21. 1923.—Seed activities in Denmark are described.—*M. T. Munn.*

6192. SÖRENSEN, S. Root seed industry in Denmark. Seed World 13³: 18-19. 1923. [See preceding entry.]

6193. SPIECKERMANN, A. Wie kann die weitere Verbreitung des Kartoffelkrebses in Deutschland verhindert werden? [How can the further spread of potato wart in Germany be checked?] Mitteil. Deutsch. Landw. Ges. 38: 175-179. 1923.—Within recent years this disease has appeared in commercial potato farms, in addition to its earlier distribution in small gardens, and energetic measures are needed to prevent its further spread, since new channels of distribution are thereby opened up. Furthermore, it is much more difficult to enforce quarantine regulations where extensive farming communities are involved. The

writer doubts the practicability of the police regulation of planting and disposal of the crop, which it is proposed to put into effect in Prussia. Other means must be employed to encourage the use of immune varieties, and the lack of an immune, late, white-fleshed, starch potato must be met by breeding. The ultimate limits of infestation must be determined, since experiment has shown that the disease may be carried in about 10 per cent of outwardly sound potatoes grown in infested soil.—*F. Weiss.*

6194. STEVENS, O. A., AND H. D. LONG. Some modifications of the vertical air-blast separator. Proc. Assoc. Official Seed Analysts North America 1919: 18-19. 1921.—A shelf is substituted for the stand supporting the glass receiving cylinder. The cylinder terminates below in a funnel, the chaff being thereby deposited directly into a container. The regular 1½ inch glass blowing tube has been replaced by a tube of slightly larger diameter and 6 inches longer for certain of the larger sized seeds.—*M. T. Munn.*

6195. VEVE, RAFAEL A. Our experience with cane varieties. Facts about Sugar 15: 482-483. 1922.—Conclusions are drawn from 11 years' tests with different cane varieties at the Fajardo Experimental Station, Porto Rico.—*C. W. Edgerton.*

6196. WALDRON, C. H. Notes on germination of Kentucky bluegrass. Proc. Assoc. Official Seed Analysts North America 1919: 14-15. 1921.—Duplicate samples of Kentucky bluegrass seed germinated in germination chambers with controlled temperature and in daylight with ordinary temperature showed a higher germination in daylight than did duplicates in the dark chamber. The room tests gave an average increase of 21 per cent over the chamber tests. The daylight tests gave the samples of low viability a much greater increase over their dark chamber duplicates than it did to the samples of ordinary viability. It is suggested that direct sunlight has a controlling effect on fungi which was not operative in the dark chamber tests.—*M. T. Munn.*

6197. WEBBER, H. J. The place of plant breeding in commercial seed companies. Seed World 104: 15. 1921. [See also Bot. Absts. 10, Entry 139.]

6198. WHITCOMB, W. O. Correlating laboratory tests of seed germination with field tests. Proc. Assoc. Official Seed Analysts North America 1920: 51-54. 1921.—Many samples of different kinds of seed were selected, tested in the regular way in the laboratory, and duplicates planted in the field in rows of 100 seed each. The statistical method is employed in analyzing the data, which show certain relationships between laboratory and field tests in the germination of seed. Preliminary tests show a somewhat higher percentage of germination in the laboratory tests.—*M. T. Munn.*

6199. WIANCKO, A. T. Italian clover seed is not adapted to Indiana soils. Seed World 91: 23. 1921.—In an experimental comparison of imported Italian red clover seed with native seed the Italian died out during the winter while the strips seeded with native seed showed no winter-killing whatever.—*M. T. Munn.*

6200. WIERINGA, G. "Daylight" germination best method for some varieties of seed. Seed World 132: 31. 1923.—The author reports detailed research with grass, vegetable, flower, and tree seeds germinated in diffuse light and in direct sunlight. Of the grasses, orchard grass, reedtop, timothy, meadow foxtail, Kentucky bluegrass, and rough stalked meadow grass germinated best in diffuse light. Canada bluegrass should be germinated in direct sunlight. Of the garden seeds, chicory, parsnip, and parsley gave the same results whether germinated in the dark or in the light. Celery, endive, and tomatoes gave decidedly better results in sunlight. A table shows the temperatures and days on which counts should be made when seeds are germinated in the dark. Methods for making 2 types of sunlight chambers are given.—*M. T. Munn.*

6201. WILSON, A. C. Tolerance limits of weed seeds. Proc. Assoc. Official Seed Analysts North America 1919: 26-27. 1921.—The author presents a table showing the number of seed per gm. and ounce for some 18 kinds of field-crop seeds. The table also shows the number of noxious weed seeds which taken collectively would render the seed unsalable for seeding purposes when a seed law requires that the prevalence of weed seeds be determined by proportion or ratio.—*M. T. Munn.*

6202. YODER, P. A. Sugar cane culture for syrup. Facts about sugar 15: 12-13, 37, 114-115, 158, 176-177, 222-223, 260-261, 302-303, 322, 328, 333, 341, 343, 380-381, 402-403, 405, 462-463, 518-520. 1922.—The author discusses cane varieties, cane soils, the cultural practices best adapted to syrup production, and cane insects and diseases.—*C. W. Edgerton.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

CARROLL W. DODGE, *Editor*

CHARLES A. WEATHERBY, *Assistant Editor*

(See also in this issue Entries 6150, 6169, 6247, 6256, 6265, 6295, 6311, 6316, 6383, 6497, 6498, 6564, 6608, 6646, 6647, 6694)

6203. BENECKE, WILHELM. Moritz Büsgen. Ber. Deutsch. Bot. Ges. 39: (87)-(96). 1921/1922.—Büsgen was born July 24, 1858, at Weilburg am Lahn and died July 22, 1921, at Hannöversch-Münden, where for 20 years he was professor of botany at a school of forestry. He had studied the ecology of insect-catching plants and of acid-soil plants, but his chief efforts were in the general subject of forestry. His principal work is *The Structure and Life of Forest Trees*. A list of his publications is given.—*C. A. Weatherby.*

6204. BORESCH, KARL. Friedrich Czapek. Ber. Deutsch. Bot. Ges. 39: (97)-(114). *Portrait.* 1921/1922.—Czapek, professor of botany at the German University in Prague, was born in that city May 16, 1868, and died July 31, 1921, from the after effects of disease contracted while serving as surgeon at a camp of prisoners of war in Bosnia in 1916. His principal studies were in physiological botany; his chief work is *The Biochemistry of Plants*. A list of 94 publications is given.—*C. A. Weatherby.*

6205. CALKINS, GARY N. The debt of science to Pasteur. Sci. Monthly 17: 1-16. 1923.

6206. HARMS, H. August Schulz. Ber. Deutsch. Bot. Ges. 39: (115)-(127). 1921/1922.—Schulz, professor at Halle, was born at Stettin Dec. 8, 1862 and died Feb. 7, 1922. His life was an almost continuous struggle with various physical infirmities; nevertheless, he accomplished much, principally in floristics and phytogeography. His *Outlines of the Development of Central Europe Since the Tertiary Period* and similar works are noteworthy. A list of his 128 publications is given.—*C. A. Weatherby.*

6207. HOWE, JAMES M., JR. George Rogers Hall, lover of plants. Jour. Arnold Arboretum 4: 91-98. 1923.—This is a short biography of Hall, who first sent Japanese plants direct to the U. S. A. and introduced such plants as *Malus Halliana* Parkmanii, *Abies homolepis*, *Magnolia stellata*, *Abies homolepis*, *Thujaopsis delabrata*, and *Lilium auratum*, now highly valued as ornamental plants.—*Alfred Rehder.*

6208. HUARD, V.-H. L'abbé Provancher. Nat. Canadien 48: 160-165, 181-188, 193-194, 198-203, 231-236, 254-260, 280-287, 1922; 49: 45-48, 64-67, 89-92, 105-110, 136-139, 162-168, 186-189, 208-211, 230-234, 258-264. 1923.—This is a continuation of a biographical sketch of the great Quebec naturalist who was the founder of *Le Naturaliste Canadien*.—*A. H. Mackay.*

6209. LESOURD, F. Quelques moyens de publicité des anciens horticulteurs. [Some means of advertising of old horticulturists.] Rev. Hort. 94: 84-85. 1922.

6210. LO PRIORE, G. **Odoardo Beccari.** Ber. Deutsch. Bot. Ges. 39: (56)–(87). *Portrait*. 1921/1922.—Beccari died at Florence Oct. 20, 1920, aged 77. He is best known for his work, systematic and ecological, on the Malesian flora, and especially on the taxonomy and phylogeny of the Palmaceae. He was also an active and ardent naturalist in other fields, such as zoölogy, and “one of the principal founders of the vitalistic theory.” A list of his numerous publications is given.—*C. A. Weatherby*.

6211. LUCAS, W. P. **Pasteur and the science of medicine.** Sci. Monthly 17: 29–34. 1923.

6212. RICHTER, OSWALD. **Karl Mikosch.** Ber. Deutsch. Bot. Ges. 39 (31)–(55). *Portrait*, 1921/1922.—This includes a sketch of the life of Mikosch (1852–1919), professor at Brünn. Austria; and a detailed account of his work on physiology and anatomy of plants. A list of 20 publications is appended.—*C. A. Weatherby*.

6213. ROSENGARTEN, F. **Cinchona and the quinine industry.** Pharm. Era 56: 537–538, 542. 3 fig. 1922.—An account is presented of the early use of Cinchona bark, the discovery and manufacture of quinine, and the introduction of Cinchona culture into the East Indies.—*C. M. Sterling*.

6214. SMITH, C. N. **A brief history of the seed trade associations in America.** Seed World 13: 19. 1923.

6215. ULTÉE, A. J. **In memoriam Dr. K. Gorter†.** Bull. Jard. Bot. Buitenzorg III, 4: 247–259. *Portrait*. 1922.—The paper deals chiefly with the scientific researches of Gorter and contains a list of his publications.—*Alfred Rehder*.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 6320, 6650, 6654, 6734, 6736)

6216. DALLEY, R. P. **A visit to the Forest Research Institute, Dehra Dun.** Pt. 1. Indian Forester 49: 227–248. Pl. 9–10. 1923.

6217. GAGER, C. STUART. **Twelfth annual report of the Brooklyn Botanic Garden, 1922.** Brooklyn Bot. Gard. Rec. 12: 25–103. 1923.—Brief summaries are given of investigations at the Brooklyn Botanic Garden during 1922 in plant pathology, forest pathology, exploration, ecology, genetics, and systematic botany; also an account of the educational activities of the Garden. The report of the director is followed by reports of heads of departments and financial statements.—*C. S. Gager*.

6218. GARDEN CLUB OF AMERICA. **Pronunciation of plant names.** 14.5 × 8 cm. 94 p. National Process Co., Inc.: New York, 1922.

6219. KIRKWOOD, ESTHER J. G. **Plant and flower forms: Studies of typical forms of plants and plant organs.** 4 to, xvi, + 80 p. Sidgwick and Jackson, Ltd.: London, 1923.—The underlying idea has been to assist the pupils to observe the typical forms of plants and plant organs, by comparing these drawings side by side with the living specimens; and so to inspire them to make a similar set of drawings for themselves. The clear line drawings are grouped to illustrate the following subjects: natural orders, pollination, fruits and seed dispersal, germination, vegetative reproduction, trees, special morphology (spines and cladodes), climbing plants. Two pages are occupied with a summary of botanical terms.—*C. S. Gager*.

6220. PATEL, R. D. **First steps in evolution.** 120 p. R. D. Patel: Nanpura, India, 1921.

6221. RABER, ORAN. **Botanical facilities in Paris.** *Sci. Monthly* 17: 35-42. 1923.—The facilities for research at the following institutions are outlined: the Normal School, Pasteur Institute, Museum of the Botanical Garden, and the University of Paris. In the last place there are 2 departments where botany is taught,—at the School of Pharmacy and the College of Science.—*L. Pace.*

6222. THONE, FRANK E. A. **Trees and flowers of Yellowstone National Park.** 70 p., 112 fig. J. E. Haynes: Saint Paul, 1923.

6223. TORREY, R. E. **Introductory botany.** 78 p. Massachusetts Agric. Coll.: Amherst, 1922.—This is a textbook written in a condensed style for the use of beginning students in botany at the Massachusetts Agricultural College. It deals wholly with the seed plants with regard to adaptation to environment from an evolutionary standpoint. Successive chapters consider: the seed plant and its organs; the seed and its germination; the root; the stem; the leaf; flower and inflorescence, fruit and seed; history of botany and principles of classification; general ecology.—*R. E. Torrey.*

6224. TORREY, R. E. **The anatomy and physiology of the seed plants.** viii + 85 p. Massachusetts Agric. Coll.: Amherst, 1922.—This companion text [see preceding entry] is for use in a second course in botany. Successive chapters deal with: structure of the cell; activities of the cell; anatomy of the vegetative system; coal and its formation: physiology of the vegetative system; reproduction of seed plants and elementary genetical principles; introduction to the lower forms of plant life. This text, as well as the one mentioned in the preceding entry, is not intended for high school use, but for college classes taught by trained botanists who will expand and clarify by means of charts, lantern slides, and discussions.—*R. E. Torrey.*

6225. WENT, F. A. F. C. **Leerboek der algemeene plantkunde.** [Textbook of general botany.] xi + 599 p., 253 fig. J. B. Wolters: Groningen and the Hague, 1923.—The book is confined to morphology and physiology. It is intended for students who have had only preparatory courses in physics and chemistry, and is planned to cover 2 years' work in college. The physiological section includes the subjects of asexual and sexual reproduction, with several sections on genetics. Systematic botany is excluded.—*C. S. Gager.*

6226. WETTSTEIN, RICHARD. **Handbuch der systematischen Botanik.** [Handbook of systematic botany.] Vol. I. 3rd rev. ed., viii + 467 p., 1915 fig., 3 diag. Franz Deuticke: Leipzig and Vienna, 1923.—The ground plan of the first 2 editions has not been essentially altered, but the details have been brought into harmony with the investigations of the 10 years preceding 1921-22. The range of subjects has been extended, and the illustrations have been increased. The book is to appear in 2 volumes, the 1st volume ending with II Abteilung. Anthophyta, I. Unterabteilung. Gymnospermae. 6. Klasse. Gnetinae.—In the general part the new headings are (1) the evolution theory as the basis of systematic botany, and (2) the significance of alternation of generations for the phylogenetic development of the plant kingdom.—In the special part the new headings are: under class Fungi A, Phycomycetes, Ascomycetes, Basidiomycetes; B, Ascolichenes, Basidiolichenes. Under VII. Stamm. Cormophyta: classification of the Cormophyta, classification of the Pteridophyta, and under the latter heading a new class, Psilophytinae.—*C. S. Gager.*

CYTOLOGY

GILBERT M. SMITH, *Editor*

(See also in this issue Entries 6316, 6474, 6482, 6487, 6615)

6227. CRÜGER, OTTO. Untersuchungen über Mesekret und Autoplastensekret. [Secretions by mesophyll cells and chloroplasts.] Ber. Deutsch. Bot. Ges. 39: 175-178. 1921.—The author examined 393 species for the presence of oil-drop secretions in the leaves. In all cases where drop secretions were observed in the mesophyll cells there was intensive secretion by the chromatophores. He thinks, therefore, that the drops in the mesophyll cells really arise from chloroplast secretions.—All species of the gymnosperms examined (28) and all of the Labiateae examined (26) contained oil-drop secretions in the mesophyll cells. Palmaceae (15), Polygonaceae (9), and Cactaceae (7) had no secretion drops in the leaves of any of the species examined. In all other species examined the presence of oil-drop secretions in the leaves seemed to be correlated with thickness of the cuticle. If the mean thickness was less than 0.5μ oil drop secretion was never observed, but if the mean thickness was over 5.0μ secretion drops were always present.—Mesophyll secretions arose in leaves of *Camellia japonica* in the light even in a CO_2 -free atmosphere, but there were no drop secretions in the darkened leaves.—S. H. Eckerson.

6228. GUILLIERMOND, A. Les constituants morphologiques du cytoplasme. [The morphological constituents of cytoplasm.] Bull. Biol. France et Belgique 54: 465-512. Fig. 1-24. 1921.—Problems in cytology can not be understood until vegetable and animal cytology are combined. In 10 years' study various organs of the frog, man, and many forms of plant life (including Ascomycetes, Algae, monocotyledons, and dicotyledons) were examined, resulting in the following conclusion: Cytoplasm seems to have a homogeneous appearance, containing in suspension certain elements among which are to be distinguished (1) a chondriome, of which a part in chlorophyll is affected by photosynthesis; (2) a vacuolar apparatus, very much reduced in animal cells; (3) fat granules. Chondriome is a constant element of cytoplasm, in both animal and vegetable cells, and seems to be wanting only in very primitive forms in which a typical nucleus is not developed. The vacuolar apparatus is equally constant, at least for vegetable cells. Fat granules are very frequent in vegetable cells, but it is not yet certain that they are generally present in cytoplasm.—A. Chase.

6229. GUILLIERMOND, A. Nouvelles observations cytologiques sur les Saprolegniacées. [New cytological observations on the Saprolegniaceae.] La Cellule 32: 429-454. Pl. 3. 1922.—In *Achlya* and *Leptomitès* the cytoplasmic inclusions and the evolution of the vacuolar system are essentially the same as in *Saprolegnia*, described in 1920. The following inclusions may be distinguished by the use of intra-vitam stains: (1) granular and rod-shaped chondriosomes; (2) lipid droplets, formed by the union of many smaller ones arising as a metabolic product in the cytoplasm (the smaller ones are what Dangeard calls microsomes); (3) granules of a glycogen-like substance, possibly precipitated out by the reagents; (4) vacuoles, containing a substance which has the characters of metachromatin in *Leptomitès* but not in *Achlya*, and which may be precipitated out as granules by the stains. Other granules of unknown composition also occur in the vacuoles.—In young hyphae the vacuolar system is made up of numerous fine, partially anastomosed filaments. As the hyphae age, these swell and unite to form the large axial vacuolar canal. The vacuolar system in a new apical segment of a hypha is not formed de novo, but as an extension of the system in the segment below. In hyphae forming zoosporangia the vacuoles fragment and become very minute and numerous. The zoospores contain such concentrated vacuoles, together with chondriosomes, lipid droplets, and granules of the glycogen-like material. At germination the small vacuoles fuse to form larger ones which develop into the vacuolar system of the new plant.—The vacuolar system, like the chondriome, is a constantly present element of the cell. Vacuoles cannot be regarded as differentiated organities of the cytoplasm (tonoplasts of DeVries; hydroleucites of Van Tieghem) incapable of arising except by division, but appear

rather to represent a system of colloidal substances which are non-miscible with cytoplasm, and which absorb water and swell, or lose water and contract or fragment, according to physical conditions. The system grows by the constant secretion of the substances composing it, and thus has a continuity; it is possible that vacuoles arise *de novo*, but this was not observed. It is probable that the reticular apparatus of Golgi and the canaliculi of Holmgren represent 2 aspects of 1 system which corresponds to the vacuolar system of the plant cell (Guilliermond and Mangelot). [See also Bot. Absts. 8, Entry 1832.]-L. W. Sharp.

6230. LINSBAUER, K. Über die kalkfreien Cystolithen der Acanthaceen. [Calcium-free cystoliths of Acanthaceae.] Ber. Deutsch. Bot. Ges. 39: 41-49. Illus. 1921.—Molisch [Österreich. Bot. Zeitschr. No. 11, 1882] early described the cystoliths of certain Acanthaceae (*Strobilanthes glomeratus*, *S. isophyllus*, *Ruellia ochroleuca*), and gave calcium-free cystoliths as characteristic for the internodes while the nodes had the usual calcium carbonate-incrusted form.—The author finds that the pith cells of young internodes of *Strobilanthes isophyllus* have typical calcium carbonate cystoliths; later the calcium carbonate dissolves and the cystoliths change to the peculiar forms which Molisch saw. The cystoliths of the cells at the nodes still retain their calcium but nodes of stems several years old have calcium-free cystoliths. Thus the calcium-free cystoliths of the Acanthaceae are calcium carbonate cystoliths which have undergone decalcification and subsequent change of form.—With the disappearance of calcium the cellulose skeleton becomes less dense, the protuberances are lost, the body shrinks in the radial direction and sinks against a lateral wall. Lignification of the original cellulose begins within, the outer hull changes to pectin. Secondary cellulose stalks attach the body to the lateral wall. As the adjacent cells divide, the calcium-free cystolith extends the length of 4 or 5 cells and appears much like a sclerenchyma fiber. The striking changes in form are shown in text-figures.—S. H. Eckerson.

6231. PIZEK, ARTUR. Chromosomenverhältnisse, Reductionsteilung und Revision der Keimenentwicklung der Mistel (*Viscum album*). [Chromosome conditions, reduction, division, and embryonic development of the mistletoe.] Jahrb. Wiss. Bot. 62: 1-19. 1923.—The author undertakes to clear up the question of whether the reproduction in the mistletoe takes place normally or parthenogenetically. The somatic divisions show the presence of 20 large chromosomes. The pollen and embryo sac mother cells undergo a typical reduction of the chromosome number, the process being somewhat different in the 2. Normal fertilization takes place, and the embryo develops, after a resting period of a few weeks. The development of the mistletoe is, therefore, not apogamous, and, in the absence of insect pollination, must be aenophilous.—S. F. Cook.

6232. SHOWALTER, AMOS M. The chromosomes of *Riccardia pinguis*. Amer. Jour. Bot. 10: 170-172. 1 pl. 1923.—In this species the haploid number of chromosomes is 10. Occasionally a small, spherical body staining like a chromosome is found among the chromosomes but is probably not chromosomal in nature or origin. The chromosomes differ somewhat in size, but only 1, the smallest, is distinguishable with much certainty. The sporophytic chromosomes have the same general appearance as those of the thallus. There is no perceptible difference between the chromosomes of the male and those of the female plants.—E. W. Sinnott.

6233. WHITING, P. W. Further points of the relation of cytology and genetics. Jour. Heredity 14: 116-118. 1923.—Shull has recently discovered crossing over in *Oenothera* while Gates, on the basis of study of the late prophase before heterotypic division, holds that conditions are not consistent with the chromosome theory of crossing over. Wenrich from cytological studies of very early stages in first spermatocytes of the grasshopper, *Phrynotettix*, shows parasynapsis of single leptotene strands. In temperature experiments with *Drosophila*, Plough shows that crossing over must take place at a very early stage in this form. Bridges shows genetically that crossing over must take place in the 4-strand stage. On the basis of his own cytological studies on *Culex*, Robertson's report on splits in anaphase chromosomes of the last spermatogonial division in grasshoppers, and Taylor's demonstration of the tetrad

nature of the 1st maturation chromosomes in plants (*Gasteria*), the author concludes that leptotene strands are really double, and hence the zygotene quadruple. There is thus the possibility of crossing over in quadruple strands at a stage much earlier than that which Gates has adequately studied.—*P. W. Whiting*.

ECOLOGY AND PLANT GEOGRAPHY

GEORGE D. FULLER, *Editor*

(See also in this issue Entries 6141, 6169, 6188, 6189, 6259, 6354, 6426, 6475, 6491, 6495, 6527, 6554, 6559, 6560, 6575, 6637, 6638, 6646, 6656, 6678, 6683, 6684, 6702, 6707, 6724, 6725)

GENERAL, CONDITIONS, MEASUREMENTS

6234. BAUMANN. Wissenschaftliche Gesichtspunkte für die Beurteilung von Sorten und Sortenversuchen mit besonderer Berücksichtigung der Anbauggebiete. [Scientific points of view for judging varieties and variety tests with special reference to culture regions.] *Mitteil. Deutsch. Landw. Ges.* 38: 309-313. 1923.—This is a discussion of the ecological relations of plants and a plea for a more exact study of their reactions to different factors of the environment.—*A. J. Pieters*.

6235. B[ROOKS], C. F. Bioclimatic zones determined by meteorological data. [Rev. of: HOPKINS, A. D. Bioclimatic zones determined by meteorological data. *Monthly Weather Rev.* 49: 299-300. 1921 (see *Bot. Absts.* 12, Entry 6238).] *Bull. Amer. Meteorol. Soc.* 2: 83. 1921.—It is possible to establish the position of life zones with meteorological data.—*Earl S. Johnston*.

6236. B[ROOKS], C. F. [Abstract of: SHREEVE, FORREST. Vertical gradients of evaporation and soil moisture in desert and coastal mountains. Paper presented at the joint meeting of Amer. Meteorol. Soc. and Assoc. Amer. Geographers, Dec. 30, 1920.] *Bull. Amer. Meteorol. Soc.* 2: 42-43. 1921.—The rainfall-evaporation ratio at the tops and bases of desert and coastal mountains was studied. Conditions best for plant growth were found at the summits of desert mountains and at the bases of coastal mountains.—*Earl S. Johnston*.

6237. GONGGRIJP, J. W. Verslag over een studiereis door een gedeelte van Venezuela. [Report of an expedition through a part of Venezuela.] *Dept. Landb. Suriname Bull.* 43. 64 p. 1921.—Venezuela possesses soil and climate of great diversity. In Venezuelan Guiana forests extend over 45,000,000 hectares. The continuation of the llanos areas appears as savannas. Delta Amacuro is low and flat, rising gradually in the south to the Imataca Mountains that form the limits of the forests. The climate of Delta Amacuro differs little from that of Suriname but is moister than that of Bolivar. Little is known of the climate of Amazonas. The region of the llanos has almost no forests but the coastal region of the Andes is partly forested. The chief forest products are rubber, balata, pendare, tonka beans, copaiva balsam and the bark of the mangrove.—The Botanical forests are apparently the driest and those near the Yuruan moister, especially those against the slopes of the Imataca Mountains. The exploration and exploitation of the forests are carefully guarded by law under which yearly permits are granted for taking lumber and other products. No cutting is allowed within 100 m. of water and provisions are made for the replacement of cut forests. The collection of gums, resins and fruits is regulated so as to prevent cutting. The maximum annual cut allowed on a concession is 1250 hectares.—*J. C. Th. Uphof*.

6238. HOPKINS, ANDREW D. Bioclimatic zones determined by meteorological data. *Monthly Weather Rev.* 49: 299-300. 1921.—The preliminary stages of a system of similar or equal zones of life and climate are presented. The major zones are the familiar frigid, temperate, and tropical, which however do not follow the parallels of latitude even at sea level. Each of the major zones is divided into from 4 to 7 minor zones. The index or characterization elements of the minor zones are many, but the most essential is the "thermal mean principle"

consisting of a table of sea level thermal constants. The thermal principle is based on the theory that (1) the temperature below that favorable for life activities during the coldest month contributes to the poleward limit of the species which characterizes a warmer zone; (2) the temperature above that favorable for the beginning of life activities during the hottest month contributes to the equatorial limit of the species which characterize a colder zone.—Bioclimatic zones thus determined are thought to be more significant than those of other systems. [See also Bot. Absts. 12, Entry 6235].—*Geo. D. Fuller.*

6239. Пачоский, И. К. [PACHOSKI, J. K.] **Основы фитосоциологии.** [Principles of phytosociology.] *iv* + 346 p. Издание студенческого Комитета Сельско-Хозяйственного Техникума [Edition of Student's Committee of Agricultural Practice, Cherson]: 1921.—The introduction is devoted to the problems and methods of study of phytosociology. The existing and possible relationships between this and other branches of botanical studies are examined and illustrated. In the body of the volume the following are among the principal subjects discussed: ecological data; biological types and growth forms (biomorphs); the forms, structure, dynamics, types and composition of plant communities; sociological types; analogies of plant societies; dynamics and stages in the development and retrogression of plant cover; types of plant formations, plant societies, herbaceous plant societies, and forest societies; the distribution of vegetation and the history of plant cover. There are also brief contributions to the study of the vegetation of former geological ages, to the extent of vegetation areas and of floras, to the phylogenetic development of vegetation, and to a consideration of plant societies and culture.—*V. Lashevsky.*

6240. REED, W. W. Climatological data for Central America. *Monthly Weather Rev.* 51: 133-141. 1923.

6241. REICHE, KARL. Die Vegetationsverhältnisse in der Umgebung der Hauptstadt von Mexiko. [The vegetation in the vicinity of the Capitol City, Mexico.] *Bot. Jahrb. Beiblatt.* 129: 1-115. 27 fig. 1922-23.—The subject matter is treated under three parts: Part I. Physical geography and climatology. Part II. Plant geography in the State of Mexico. Part III. The floral catalogue. Under the first part the following headings are found: (1) Orography and hydrography; (2) Climatology. The 2nd part is divided into: A. The plant formations; I. Of forests and steppes; 1. The forests in Desierto de Los Leones; 2. The Canada of Contreras; 3. Mount Ajusco; 4. The vegetation of Cerro San Miguel and of the upper part of Canada; 5. The vegetation of the volcano Xitle; 6. The vegetation of the Sierra de las Cruces; 7. The vegetation of the Barranca de Cuajimalpa; 8. Smaller forests; 9. The formation of jungles and thickets as remains of earlier forests; 10. Mount Ixtapalapa; 11. Mount Santa Catarina and its neighbors; 12. The Nochitepec (flower mountain); 13. The Tentli; 14. Mount Chimalhuecan; 15. The Cerro del Pino and its neighbor Texotote; 16. Mount Texcotzingo; 17. The Sierra de Guadalupe; 18. Mount Calacoaya; 19. The Pedregale (lava fields); 20. The vegetation of the rolling and flat lands. II. The formations of the alluvium; 1. Vegetation of more or less saline soils or waters; 2. Vegetation of the non-saline soils or waters. III. The formation of weeds and cultivated plants. IV. Fossil plants. V. Tabular view of the previously described formations. B. Local peculiarities of the flora of the regions concerned; the relation of this flora to the neighboring states and to America as a whole, endemism. C. Ecological peculiarities of some plants of the region; 1. Biology of vegetative organs; 2. Biology of the reproductive organs; 3. Lianes and climbing plants, epiphytes, parasites; 4. Water plants; 5. Periodicity in the vegetation; 6. Notable damage to the vegetation caused by fungi. Under Part III a list of the species is given following comments on the flora and some statistics. A total of 1488 spermatophytes occur in the region. The list includes also the lower plants.—*K. M. Wiegand.*

6242. SMITH, J. WARREN. Agricultural meteorology. *Bull. Amer. Meteorol. Soc.* 1: 19-20, 63-66. 1920.—Topics for work and discussion in relation to agricultural meteorology are suggested.—*Earl S. Johnston.*

STRUCTURE, BEHAVIOR, SYMBIOSIS

6243. ANONYMOUS. [Rev. of: ASHBY, EDWIN. Sensitive labellum in orchids. Minutes of a meeting of the Linnaean Society on May 4th, (1922).] Jour. Indian Bot. 3: 116. 1922.

6244. BACHMANN, E. Untersuchungen über den Wasserhaushalt einiger Felsenflechten. [Investigations on the moisture relations of some rock lichens.] Jahrb. Wiss. Bot. 62: 20-64. 1923.—The author has studied the conditions governing the relative amount of water absorbed and given off by several species of foliose and crustose lichens, including the following: *Umbilicaria pustulata*, *Gyrophora vellea*, *G. cirrosa*, *G. polyphylla*, *G. hirsuta*, *G. cylindrica*, *Lecidea bullata*, *L. athroocarpa*, *L. speira*, *Rhizocarpon geographicum*, *R. obscuratum*, *Pannaria pezi-zoides*, *Lecothecium nigrum*, *Diploschistes bryophilus* and *D. scruposus*. The author finds that the foliose species are much superior to the crustose forms in their ability to absorb rain water. However, the crustose forms absorb more running water, per gm. dry weight, than the foliose, and also lose water more rapidly when subjected to dry conditions, with the exception that under the direct rays of the sun the condition is reversed. *Gyrophora vellea* and *G. cylindrica* excel the other forms in absorbing water vapor. The same crustose lichen behaves differently toward water depending on the type of rock substratum. The less compact the rock the more developed is the thallus and consequently the greater is the ability to take up water. In contrast to those lichens possessing special organs of absorption are some which are destitute of these but which still flourish. The author concludes that the plasma of these types can endure more adverse conditions and can carry on the processes of life with less water.—S. F. Cook.

6245. FUNKE, G. L. Recherches biologiques sur des plantes à tiges rampantes. [Biological research on plants with creeping stems.] Compt. Rend. Acad. Sci. Paris 176: 604-606. 1923.—Differences in the humidity of the air immediately about the plants have been held as a possible explanation of differences in the structure of erect and creeping stems of the same species. In a set of experiments plants were grown in dry and moist conditions, the humidity differing by 40°-50° throughout the entire period. The plants in the more humid atmosphere had better developed parenchyma with cells of about the same size, they had fewer but larger vessels, more feebly developed sclerenchyma, a smaller vascular cylinder in proportion to the diameter of the stem, and much thinner leaves. These differences are similar to those of creeping and erect stems. Two species of *Potentilla* and 1 each of *Fragaria*, *Hieracium*, *Lysimachia*, and *Glechoma* were studied.—C. H. Farr.

6246. NAVEAU, R. Enkele veranderingen door aanpassing bij *Sphagna*. [Some changes by adaption in *Sphagna*.] Natuurw. Tijdschr. 4: 166-170. 1922.—Systematic investigations of several *Sphagnum* forms show that the various facies are dependent upon light and water. A plant growing in direct light usually has no green leaves, and shade plants are green. Much light and little water retard the formation of chlorophyll, change the green to yellow or red, and give a low compact plant; but with little light and much water the plant remains green and has a loose appearance. *Sphagnum crassicaudum* v. *plumosum* behaves like a true aquatic, the hyaline cells keep their protoplasm and maintain the same activities as the green cells. When water diminishes the *plumosum* form of several *Sphagnum* species changes. The quantity of water in a *Sphagnetum* depends partly upon the quantity of light. In little light and little water *Sphagna* are very compact, forming cushions. Incurved, wavy and projecting leaves belong to the relatively dry group, incurved stiff leaves to the aquatic group. Different conditions of illumination and water supply produce forms of *S. crassicaudum* Wt. that have been recognized as different varieties. The same thing seems to occur in *S. magnifolium*. The development of red pigment is also promoted by decreased water supply and greater illumination.—J. C. Th. Uphof.

6247. RAMSBOTTOM, J. Orchid mycorrhiza. Trans. British Mycol. Soc. 8: 28-61. Pl. 2-7. 1922.—This paper is essentially a critical review of the literature on mycorrhizas with special reference to the cultivation of orchids and the physiological relations between the seed

plants and the mycorrhizal fungi. It is pointed out that in families in which endotrophic mycorrhizas are typically developed the seeds are small and ill-adapted for successful germination but are produced very abundantly thus increasing the probability that some of them will meet with exceptionally favorable conditions for germination, these conditions usually including the presence of the endophytic fungus.—*W. B. McDougall.*

6248. RAYNER, M. CHEVELEY. Mycorrhiza in the Ericaceae. Trans. British Mycol. Soc. 8: 61-66. 1923.—The recent work of Christoph which is at variance with that of Rayner is criticized as inaccurate and lacking in proof at various stages. It is reiterated that under experimental conditions the development of the *Calluna* seedling is bound up with infection by the endophytic fungus and that such infection takes place regularly from the testa of the seed at, or subsequent to, germination.—*W. B. McDougall.*

6249. RIMBACH, A. Die Jahresperiode der Pflanzen bei Montevideo. [Seasonal periodicity of the plants at Montevideo.] Bot. Jahrb. 58: 182-189. 1923.—Six tables of native, introduced, and cultivated plants are given showing the duration of foliage and the blooming season of herbaceous and woody species and the period of shoot-elongation and fruiting of the latter. Some herbaceous plants bear leaves in summer, others in winter. The leafless period of woody plants is winter or after the spring. Herbaceous and woody plants bloom in all months of the year but the shoots of woody plants occur in the spring.—*K. M. Wiegand.*

VEGETATION

6250. CAMPBELL, DOUGLAS H. Australasian botanical notes. II. Victoria, South Australia, and West Australia. Amer. Jour. Bot. 10: 173-186. 2 pl. 1923.—An account is given of the characteristic vegetation of these states, with notes on some of the more conspicuous and important species. The history of the peculiar flora of Western Australia is discussed.—*E. W. Sinnott.*

FLORISTICS

6251. GLEASON, HENRY ALLAN. Evolution and geographical distribution of the genus *Vernonia* in North America. Amer. Jour. Bot. 10: 187-202. 3 fig. 1923.—The section *Lepidaploa* of this genus includes 120 species in North America. Of this there are 2 sub-sections, each well developed in continental South America and extending northward. In one of these the inflorescence is a leafy-bracted scorpioid cyme and in the other the bracteal leaves are suppressed. Minor species groups are based on differences in achenes, involucre, pappus, and pubescence. Characters presumably primitive in one group may indicate advanced evolution in another, and such characters have no apparent correlation with environment. The center of evolution and migration for these plants is presumably South America. In all cases those groups which are morphologically the most primitive occur farthest south and the more complex ones appear progressively farther north, and this situation is true for most of the individual species, as well. All the evidence indicates that progressive evolution and northward migration have proceeded together.—*E. W. Sinnott.*

6252. Пачоский, П. К. [Pachoski, J. K.] По пескам Днепровского уезда. (Ботанические экскурсии.) [Sandy country of Dnieper district. (Botanical excursions.)] 146 p. [Cherson, 1919.]—Here are given the results of a phytogeographical study of the sandy regions of the Dnieper district (Cherson province). The origin of the elements of the flora is discussed and a synoptical list of the species is given.—*V. Lashevsky.*

6253. RIDLEY, H. N. The distribution of plants. Ann. Botany 37: 1-30. 1923.—Changes in the distribution of plants are discussed comprehensively with numerous examples chosen chiefly from the Malay region. The chief factors dealt with are changes in climate and in land surface and human agencies. Under the latter head are discussions of the destruction of arboreous vegetation (including an account of the fate of a tropical forest), extinction in

wild state of plants of economic value, introduction of ornamental plants which become wild, and weeds. Weeds are considered as follows: (1) relation to human migrations; (2) methods of introduction,—(a) in pot plants, (b) with seeds of cultivated plants, (c) by transport of cattle, (d) in packing material, ballast and cargo of ships; (3) accounts of dissemination of particular weeds; (4) qualities affecting rapidity and distance of travel.—The most widely distributed plants are weeds, sea-dispersed species, and those with bird-carried seeds. Dispersal by sea is superior both in time and distance to that by wind. The reasons for the very wide distribution of certain species of flowering plants and the course of their dissemination is discussed.—Endemics are divided into 2 easily distinguishable groups, (1) relics of a lost flora and (2) species evolved in 1 locality which have spread no further. Many examples of the difficulty of interpreting distribution on the basis of the age-and-area theory are pointed out particularly in regard to weeds where the actual histories of dissemination are known, and in regard to such plants as *Cycads*, *Sequoia*, *Salisburia*, *Platanus*, etc.—*W. P. Thompson*.

6254. ROMIEUX, HENRI. Sur la florule de la Vallée de Couches (Valais). [The flora of the Vallée de Couches (Valais).] Bull. Soc. Bot. Genève 13: 31. 1921.

FOREST BOTANY AND FORESTRY

W. N. SPARHAWK, *Editor*.

(See also in this issue Entries 6203, 6216, 6237, 6461, 6516, 6517, 6539, 6644, 6652, 6653, 6671, 6680, 6693, 6694, 6710)

6255. ANONYMOUS. Denkschrift des badischen Ministeriums der Finanzen—Forstabteilung—über Waldstreuabgabe und Waldbewirtschaftung. [Memorandum of the forest section of the Baden Ministry of Finance, on utilization of forest litter.] Forstwiss. Centralbl. 45: 107-120. 1923.—As forests are now the chief sources of revenue for several German states, and as there is a great shortage of timber and fuel, it is essential to maintain maximum yields. The practice of granting farmers the right to remove leaf litter for bedding stock, which developed to great proportions during the war, must be restricted or eliminated if possible. The productivity of forest soil depends to a great extent upon the presence of a loose cover of decaying vegetation, which retains moisture, keeps the soil loose and permeable, keeps the fine soil particles and plant food from leaching out or washing away, helps to break down the soil into available plant food, and harbors a multitude of minute life which is indispensable for thrifty forest growth. The volume of bacteria, fungi, protozoans, worms, and insects on a hectare of undisturbed forest soil has been estimated at 1,000-2,000 kgm. or as much as the weight of domestic animals kept on an equal area. Soil culture can accomplish far more than culture of the timber stand in increasing forest yield. In numerous instances continued removal of litter has resulted in retarding growth and even in reducing once thrifty forest to mere scrub. Not only are height, diameter, and volume growth affected, but natural regeneration becomes difficult or impossible, and the forest becomes more susceptible to damage by insects and disease. Experiments over 27 years in Bavaria showed 50 and 30 per cent reduction in yield of beech and pine respectively when the litter was removed; 80-year examples show yields 3-3½ times as great where litter was left on the ground, as compared with stands from which it was removed; 14-year records in Baden showed losses in increment of 11-16 per cent due to removal of litter. In the first 6 months of 1922, about 350,000 cubic m. of litter was taken from the forests of Baden. Each cubic m. represents a lost increment worth 3,000 marks (October, 1922, values), making the total loss 1 billion marks. While some litter may still be taken from forest roads and fire lines, the bulk of the demand should be met by substitutes, especially conifer twigs and peat. A confirmation of the statements in this memorandum is appended over the signature of the Forest Institute of the University of Freiburg.—*W. N. Sparhawk*.

6256. ALLEN, E. T. America's transition from old forests to new. Amer. Forest. 29: 163-168, 235-240. 12 fig. 1923.—This article outlines the destruction by fire, the popular indifference, the vast and mushroom growth of the Middle West with its stimulating demand

for lumber, and finally the period of occupation of the western forests, both governmentally and individually, described as the most defined and pregnant of American forest history. The concluding instalment describes the natural development of forest resources and forest policies in the West, and shows the inevitable drift toward a just and sound national forest policy.—*Chas. H. Otis.*

6257. BALTZ, CARL. *Die Förster der Kommunalverbände, öffentliche Anstalten, gemeinschaftlichen Holzungen und Waldgenossenschaften.* [Foresters of communal organizations, public institutions, community forests, and forest associations.] *Zeitschr. Forst.- u. Jagdw.* 54: 339-348. 1922.—The author defines and clarifies the status and prerogatives of the foresters of the various classes in the light of the municipal officer statute of July 30, 1899, and laws and ordinances of December 24, 1816, August 14, 1876, and October 12, 1897.—*J. Roesser.*

6258. BEALS, E. A. *Discussion of thunderstorms and forest fires in California.* *Monthly Weather Rev.* 51: 180-182. 1 fig. 1923.—The difficulties in forecasting storms are pointed out, and the need for further study of forecasting is emphasized.—*E. N. Munns.*

6259. BERGMANN, M. *Gedanken zur Bonitierung im Dauerwald.* [Suggestions on classifying site qualities.] *Deutsch. Forstzeitg.* 38: 184-185. 1923.—Quality of forest sites may be classified on the basis of height and volume growth, or according to the composition and condition of the soil itself. Height and volume growth depend upon the industry and skill of the forester, while chemical and physical analyses of the soil are hardly practical and do not show the amount of plant food actually available. The native vegetation affords a reliable index of site quality, providing allowance is made for variations in density of forest cover, as the indicator plants under a dense canopy are not the same as those under an open stand on the same site.—*W. N. Sparhawk.*

6260. BERLIN. *Zu "Betriebsregelung im Dauerwalde."* [Concerning "Betriebsregelung im Dauerwalde."] *Zeithschr. Forst.- u. Jagdw.* 54: 309-316. 1922.—The author describes the silvicultural conditions in the forest of Wabel, which has recently been placed under the continuous system of management by the state, and outlines the form of management and control book. The stand is one of almost pure pine, in which most of the old trees have been destroyed by insects. The management form employed is somewhat simpler than that used at Bärenthoren and described by Wendroth [see Bot. Absts. 12, Entry 5593]. Although most advocates of the continuous system consider age-class distinctions worthless, the author finds the construction of age-class tables from the management book a matter of only a few hours extra work, and they provide a second regulator for the determination of cut and yield. The construction of a yearly cutting plan is also deemed necessary.—*J. Roesser.*

6261. BIRNER. *Die Wirtschaftsführung in einem vormaligen Auemittelwalde.* [The management of a former coppice-with-standards forest on meadowland type.] *Zeitschr. Forst.- u. Jagdw.* 54: 290-305. 1922.—The Grünwald forest is threatened with destruction, since it lies in the overflow territory of the Elbe on land desired for farming. The variation between maximum and minimum soil moisture is the greatest in any forest type. The soil is very productive, but when the water is lowered the loam soil becomes almost impervious and vegetation must depend upon atmospheric moisture, which here is lower than elsewhere in Germany. The original silvicultural system was coppice-with-standards, the principal species being elm and pedunculate oak. As the demand for lumber replaced that for fuelwood, the old system was abandoned (1884) for the high-forest system. Contrary to common opinion, it was discovered that the best high-forest stands of elm developed from root sprouts and the typical plan of management now calls for reproduction of elm by root sprouts and filling in after 2 years with ash nursery stock. Greatest care should be exercised in selecting seed for sowing from stands of straight-boled trees. The present form of management is shelter-wood selection with group reproduction.—*J. Roesser.*

6262. BRONSART, VON. Zu "Gedanken aus dem Walde" von Oberförster A. D. Fricke in Januarheft. [In re "Gedanken aus dem Walde" (see Bot. Abst. 12, Entry 5531) by forest superintendent A. D. Fricke.] Zeitschr. Forst.- u. Jagdw. 54: 365-366. 1922.—The controversy between advocates of continuous forest management and of clear-cutting methods has primarily concerned management form only, rather than the more important consideration of soil fertility. Soil care should be the starting point in forest management, and clear-cutting must be avoided; but whether the even-aged high forest or the selection forest shall be retained is immaterial, as maintenance of soil fertility is possible under both forms. To secure and maintain fertility, the chief demand of future management will be to protect the soil from wind, mainly by establishing effective protection screens around the borders of the forest. Other protective methods, such as understory and advance reproduction, will depend upon local factors. With proper treatment of the soil and of the stand, fungous and insect calamities, which now so often threaten to pass beyond control, will gradually be checked.—*J. Roesser.*

6263. BROWN, THOS. W. A report on forestry and horticulture in Palestine. In: A review of the agricultural situation in Palestine. Part II, p. 7-16. Government publication: Haifa, Palestine, 1923.—Aleppo pine is the most valuable timber tree in Palestine, but the cypress (*Cupressus sempervirens* L.) should be cultivated much more than at present. Several species of eucalyptus are cultivated, of which *E. resinifera* Sm. seems to be the best. Carob-trees (*Ceratonia siliqua* L.) are more properly regarded as fruit or fodder trees than as timber, as the pods contain a large amount of sugar. The writer speaks of the various stocks for grafting oranges. He recommends the introduction of sisal as a source of fiber.—*John E. Dinsmore.*

6264. BUTLER, O. M. Seating the Nation. Amer. Forest. 29: 216-217, 244. 2 fig. 1923.—The article concerns chairs and the great and needless waste of wood incurred in their manufacture.—*Chas. H. Otis.*

6265. CLAPP, E. H. The long haul from the woods. Amer. Forest. 30: 259-264, 320. 7 fig. 1923.—This article traces the increased cost of lumber transportation from early times to the present, as large-scale logging in the U. S. A. has passed from East to West and the short hauls have given way to trans-continental freight shipments.—*Chas. H. Otis.*

6266. DE, R. N. Germination of *Barringtonia acutangula* seeds. Indian Forester 49: 268-270. 1923.—The seed float on the flood waters of shallow lakes and rivers until they come to rest during the subsidence of the flood. After germination and early growth, especially after a year, they can again stand submergence, though if covered too deeply they may not survive.—*E. N. Munns.*

6267. DENZIN. Die Zerlegung der Mischbestände nach Teilflächen. [The parcelling of mixed stands.] Zeitschr. Forst.- u. Jagdw. 54: 330-339. 1922.—The author replies to Trebeljahr's critique [see Bot. Absts. 12, Entry 2395] of his previous paper [see Bot. Absts. 11, Entry 2354]. Trebeljahr considers the parcelling of mixed stands even from the purely theoretical standpoint to be impossible. His view, that the working sections defined by the Prussian management-plan instructions of 1912 are not true working sections, as recognized in forestry, is based on a false concept. The method prescribed in the 1912 instructions is based on clearer and more reliable facts, is simpler, secures a better arrangement and more orderliness in the stand, and requires less control calculations by the officer in charge than do the instructions of 1919. In fact, Trebeljahr's condemnation applies to his system more than it does to the instructions of 1912.—*J. Roesser.*

6268. ENDRES. [Rev. of: HEDLER, WALTER. Deutschlands Forst.- und Nutzholzwirtschaft in und nach dem Weltkriege. [German forest and timber administration during and after the war.] 119 p. Reichenbachsche Verlagsbuchhandlung: Leipzig, 1921.] Forstwiss. Centralbl. 45: 63-68. 1923.—Hedler is a military man, not a forester. His book would have

been satisfactory had he stopped with a description of the war-time regulation of forest industries. His treatment of silvicultural and economic matters only betrays his ignorance. Its central thought appears to be that German forestry can function effectively only under the direction of Major Hedler.—*W. N. Sparhawk.*

6269. ESCHERICH, K. *Parasitenwirkung und biologische Bekämpfung.* [The work of parasites and the biological combat method.] *Zeitschr. Forst.- u. Jagdw.* 54: 193-198. 1922.—The author discusses Knoche's criticism of his book and other works advocating the fighting of destructive insects by their natural enemies (biological method), and summarizes briefly his present view of the parasite situation. He asserts that the intensive culture of a host plant has the same significance as the importation of a destructive insect into a country where the parasites which tend to control its spread are missing. Reference is made to the brown-tail and gypsy moth calamities in America. By returning to more natural conditions in forest management and producing more mixed forests in preference to pure stands, the author believes that conditions will favor the natural parasitic enemies of destructive insects and thus lessen the danger from these insects. The recent tendency in forest management seems to be in this direction, due in part, at least, to the ever increasing destruction of forests by insects.—*J. Roesser.*

6270. ETTINGER, J. *A note on the comparative merits of the stone and the Aleppo pine.* In: *A review of the agricultural situation in Palestine.* Part II, p. 25-26. Government Publication: Haifa, Palestine, 1923.—A detailed botanical and economic comparison of the 2 species of pine found in Palestine (*Pinus pinea* L. and *P. halepensis* Mill.) includes directions for propagation, cultivation, and spacing of the stone pine.—*John E. Dinsmore.*

6271. EULEFELD. *Die Durchlüftung des Waldbodens oder Aufhebung der Wurzelkonkurrenz.* [Ventilation of forest soil or prevention of root competition.] *Deutsch. Forstzeitg.* 38: 460-461. 1923.—Loosening the soil to let in the air, by plowing or otherwise, stimulates growth, just as cultivation does with farm crops. Growth stagnation is not due primarily to root competition, as some investigators believe.—*W. N. Sparhawk.*

6272. FABRICIUS. [Rev. of: REBEL, KARL. *Waldbauliches aus Bayern.* [Silvicultural notes from Bavaria.] 293 p. Jos. C. Hubers Verlag: Diessen vor München, 1922.] *Forstwiss. Centralbl.* 45: 68-76. 1923.—The author presents his observations resulting from 14 years in a responsible position in the Bavarian service. While the reviewer does not agree with all of his statements and conclusions, he considers the book an exceedingly valuable contribution to silvicultural knowledge.—*W. N. Sparhawk.*

6273. FABRICIUS, L., UND HANS FR. GROSS. *Heizwert und Wärmepreis der Brennholzer.* [Heating value and price of fuelwood.] *Forstwiss. Centralbl.* 45: 83-100. 1923.—The method of measuring heat values by the bomb calorimeter is described, and a table shows heat units per kgm. and per cubic m. of air-dry wood of various species. Reduction factors are given for computing the heat values for stacked wood of several grades. The conifers generally have greater heating value per kgm., but the greater specific gravity of the hardwoods more than compensates for the difference. With increasing age of tree the heating value per unit weight increases, while the density of the wood decreases. Except for pine, the heating value of fungus-infected wood is practically as great as that of sound wood. The proper price to be paid for fuelwood, in comparison with that for coal, can be computed on the basis of available heat units.—*W. N. Sparhawk.*

6274. FORBES, R. D. *The passing of the piney woods.* *Amer. Forest.* 29: 131-136, 185-186. 7 fig. 1923.—Annually $\frac{3}{4}$ million acres of pine land, chiefly in the Gulf Coast States, are stripped so clean and then burned so thoroughly as to be incapable of satisfactory natural reforestation within half a century, and some will undoubtedly take more than a century. If forestry were practiced it is believed that, with a lapse of only a few years following the

exhaustion of the important virgin stands, an annual cut of 6-8 billion board feet of southern pine could be counted upon indefinitely. If forestry is not practiced the annual cut will become less and less, and the price of lumber higher and higher.—*Chas. H. Otis*.

6275. FRITZ, FRANCIS M. *The elfin forest of California*. 267 p. 123 fig. Times-Mirror Press: Los Angeles. 1923.—This is a popular account of the chaparral forest region of southern California, giving briefly the importance of the chaparral in preserving the water supply and the soil on the mountains, as well as an account of the various trees, shrubs and flowers found in the region.—*E. N. Munns*.

6276. GUIBIER, H. *L'aménagement des forêts en Indochine*. [Forest management in Indo-China.] Bull. Econ. Indochine 24: 491-585. *Illus.* 1922.—This is a comprehensive, well illustrated consideration of forestry and forestry conditions in Indo-China.—*E. D. Merrill*.

6277. HARRER. *Produktionssteigerung im kleinen Privatwald*. [Increasing the production of small private forests.] Forstwiss. Centralbl. 45: 41-52. 1923.—An essential part of the program of increasing German timber production is to increase production from small private holdings which are not now managed for continuous production. These tracts, which include about $\frac{1}{2}$ of the private forests in Germany, or between 3 and 4 million hectares, do not yield much over 1 cubic m. of wood per hectare per annum, while under proper management the yield could be increased by at least 2 cubic m., worth 15 gold marks per cubic m. This increase can be brought about by introducing fast-growing species, particularly Douglas fir, by lengthening the rotations and producing a greater proportion of stem wood, and by coordinating management. The owners individually cannot accomplish it, consolidation of holdings is impracticable, and state ownership out of the question; hence the only practicable means is through the formation of forest cooperatives, managed under state supervision, with membership compulsory for all small owners whose forests do not admit of sustained yield management by themselves.—*W. N. Sparhawk*.

6278. HOENTHAL, GEORG. *Dauerwald und Privatwaldbesitz*. [The continuous forest and private forest ownership.] Zeitschr. Forst.- u. Jagdw. 54: 364. 1922.—A private owner disagrees with Roth. While acknowledging that the continuous forest is correct in principle, he advocates caution in adopting it on private holdings, since its success depends largely upon the experience and ability of the forester in charge. Hohenthal predicts increasing popularity for the system under private management, even though it requires more ability on the part of the forester than does the schematic clear-cutting system.—*J. Roesser*.

6279. HOSMER, R. S. *Town forests and community chests*. Amer. Forest. 29: 155-157. 4 fig. 1923.—This article describes European town forests, the income from which goes to the support of hospitals, libraries, museums and other quasi-public institutions, and shows how similar forests could be utilized in America.—*Chas. H. Otis*.

6280. JUNACK. *Bekämpfung von Waldbränden*. [Fighting forest fires.] Deutsch. Forstzeitg. 37: 784-787. 1922.—Methods are described for trenching, back-firing, patrol, and final extinguishing of fires.—*W. N. Sparhawk*.

6281. K., S. Z. *Fortschritte auf dem Gebiete der Färbung stehender Bäume*. [Progress in coloring standing trees.] Deutsch. Forstzeitg. 37: 770. 1922.—After 10 years' experimentation, Reimann has developed a practical process for coloring the wood of standing trees. The coloring matter, a dilute aniline dye, is introduced near the base of the tree by means of a specially constructed borer and a 100-l. container operating by pressure of the contained liquid. In 2 days the color penetrates even to the foliage. In 8 days more the tree is felled, and 8 days later it is sawed up. Penetration is uniform, and the process gives promise of great economic importance.—*W. N. Sparhawk*.

6282. KATZER, K. *Zur Gliederung der Forstwissenschaft in Produktionslehre und Betriebslehre.* [On the division of forestry into the branches of production and operation.] *Forstwiss. Centralbl.* 45: 100-107. 1923.—The 3 main subdivisions of forestry are: technical forestry, including production and utilization; economic forestry; and forest administration.—*W. N. Sparhawk.*

6283. KIRKLAND, B. P. *The iron horse of the West.* *Amer. Forest.* 29: 205-209. 5 fig. 1923.—It is pointed out that the Pacific Northwest contains the last great stand of old coniferous forests yielding large percentages of clear, first-quality timber. The typical old forest of the Northwest does not exceed 300-500 years in age, although in some limited areas fires appear to have been absent for periods as long as 1,000 years. The forests were from the start in ideal condition for management; but no time should be wasted in establishing young stands following logging operations, since such negligence will result in depletion of growing stock and inevitable future reduction of annual cut. A short history of the lumber industry is given, leading to the statement that at present rates of cutting, privately owned old timber in western Washington will be entirely cut in 20-30 years, with Oregon and California following later. Foresight and intelligence are needed to bring about a continuous yield. The writer believes that, given proper management, the forests of western Washington should give an annual production forever of approximately 6 billion feet of saw-timber and 6 million cords of other forest material.—*Chas. H. Otis.*

6284. KITSON, LELA C. *The piñon.* *Amer. Forest.* 29: 153-159. 2 fig. 1923.—Popular.—*Chas. H. Otis.*

6285. LEMMEL. *Das Problem der volkswirtschaftlichen Produktivität und seine Stellung in der Staatsforstwirtschaft.* [The problem of economic productivity and its significance in state forestry.] *Zeitschr. Forst.- u. Jagdw.* 54: 199-226. 1922.—The author discusses the problem in its relation to state forest management. The big question to be answered is: which production method most fully satisfies the economic interests of the nation? The technical, economic, financial, and highest soil rental rotations are considered separately. The last chapter considers the relation of the previously discussed economic principles to the business of the state; briefly, whether state management should be directed toward securing financial gain or toward social or community betterment.—*J. Roesser.*

6286. MCCARTHY, E. F. *Forest fire weather in the Southern Appalachians.* *Monthly Weather Rev.* 51: 102. 2 figs. 1923.—The relationship of temperature, humidity, evaporation, precipitation, and vapor pressure to the occurrence of fires from September to November, 1922, is pointed out. The fact that Weather Bureau data can be translated into usable information regarding the fire situation shows the value of graphic studies of existing records.—*E. N. Munns.*

6287. McLOUD, N. C. *Holding the banks of the Mississippi.* *Amer. Forest.* 29: 242-243, 249. 3 fig. 1923.—The author describes the making of willow mats, sometimes as large as 250 by 1,000 feet and their use as revetments to stop erosion and cutting of the banks of the Mississippi River.—*Chas. H. Otis.*

6288. MADLUNG. *Wirksame Verdrängung der Heide durch die perennierende Lupine.* [Suppressing of heather by means of perennial lupine.] *Deutsch. Forstzeig.* 38: 324-327. 1923.—Lupine sowed between the rows in oak nursery beds, and scattered broadcast on bushy areas on exposed sites, has proved very effective in keeping down the growth of weeds and heather, and at the same time stimulates the growth of the young trees. It furnishes forage for wild game during the fall and winter, and its blue flowers are of great esthetic value.—*W. N. Sparhawk.*

6289. MILNER, C. E. *A visit to Myitmaka training works, Burma.* *Indian Forester* 49: 175-182. Pl. 7-8. 1923.—An account is presented of a project to reclaim lowlands and to develop a stream suitable for floating logs.—*E. N. Munns.*

6290. MOBBS, E. C. **The management of high forests in the Vosges and Jura Mountains.** *Indian Forester* 49: 183-197. 1923.—The author gives an account of a trip through the French forests.—*E. N. Munns.*

6291. MÖLLER. **Allgemeine Wirtschaftsgrundsätze.** [General principles of management.] *Zeitschr. Forst.- u. Jagdw.* 54: 243-250. 1922.—Möller makes public 2 communications, one from the chief forester of Stettin, the other from the Department of Agriculture and Forestry of Prussia, in relation to the management of forests in the plains region of northwest Germany. The principles of the continuous management system (avoidance of clear-cutting, natural regeneration, and soil culture and protection) are prescribed. The latter edict enters into considerable detail; demands, in general, the prevention of further soil deterioration (raw humus formation), the reduction of the amount of dry peat deposits, and the conversion of undesirable stands, especially pure conifer stands, into mixed stands of conifers and hardwoods.—*J. Roeser.*

6292. OELKERS. **Die Aufforstungen in der Lüneburger Heide.** [Afforestation on the Lüneburger heath.] *Deutsch. Forstzeitg.* 37: 800-803. 1922.—Hanover, which is 18 per cent forested, has 133,835 hectares of moorland, half of all there is in Prussia; 98 per cent of it is privately owned. Over 23,000 hectares has been afforested by the provincial government, communes, and private owners. Planting was done on plowed strips, using 1-year pine and 2-year spruce seedlings, and seeds of pine, spruce, and larch. Along paths and roads, protection strips of oak, birch, maple, and alder were planted. Shallow plowing and seeding proved more successful than deep plowing and planting. The common method is to burn during the 1st winter at a time when only the heather will be burned and the humus will be left intact, harrow the ashes into the soil, plow 20 cm. deep the 2nd year, and sow the seed in the 3rd spring.—The cool, damp climate, the absence of lime in the soil, and the cultivation of pure conifer stands tend to cause the formation of hardpan and upland moors. Remedies include cultivation of mixed stands, early and heavy thinning, removal of litter. Introduction of beech, fir, and larch has stimulated growth of the pine.—*W. N. Sparhawk.*

6293. O[SMASTON], A. E. **A review.** [Rev. of: (1) CHAPMAN, H. H. **Forest mensuration**, xxii+ 553 p. J. Wiley & Sons: New York: Chapman and Hall, Ltd.: London, 1921 (see Bot. Absts. 12, Entry 1695). (2) WINKENWERDER, HUGO, and E. T. CLARK. **Handbook of field and office problems in forest mensuration.** 2nd ed., 133 p. J. Wiley & Sons: New York, 1922.] *Indian Forester* 49: 82-93. 1923.—Both books are worth reading and keeping for reference. Many of the American problems are closely akin to those of India. It is difficult at first reading to understand the American terminology. [See also Bot. Absts. 12, Entries 393, 2354.]—*E. N. Munns.*

6294. PARKER, R. N. **Artocarpus hirsuta as an underwood for teak.** *Indian Forester* 49: 248-251. 1923.—Usually *A. hirsuta* has failed in sowings under teak, but success attended broadcast sowing followed by hoeing and covering of the seed. Growth was rapid on established trees, the maximum being 38 inches in girth at 18 years. Five teak standards and 83 *A. hirsuta* saplings were found on a "square chain." When the 2 species are introduced together, it is doubtful as to which will form the final stand.—*E. N. Munns.*

6295. PARKER, R. N. **Natural regeneration of Eucalyptus.** *Indian Forester* 49: 251-252. 1923.—Natural seedlings of *E. dealbata* and *E. globulus* were found after a severe fire on an area where *Pinus longifolia* had been destroyed by fire.—*E. N. Munns.*

6296. PICCIOLI, ELVIRA. **Richerche sperimentali su legni stranieri, mogano, Cedrela.** [Researches on foreign woods, mahogany, Cedrela.] *Staz. Sper. Agrarie Ital.* 55: 51-79. 6 fig. 1922.—This article discusses the characteristic differences between the genera *Swietenia* and *Cedrela*. It includes information on the source of the principal commercial species sold as mahogany or cedrela, the quantities imported, their technical properties, uses, and dis-

tinguishing anatomical characteristics. Figures drawn from microtome sections, in 3 planes, are shown for *Swietenia mahagoni* and *Cedrela odorata* respectively.—The following species of *Swietenia* are discussed: *S. angolensis* Welw., *S. humilis* Zucc., *S. macrophylla* King, and *S. mahagoni* Jacq. The common and trade names used in different countries are cited. A very detailed discussion of the anatomical characteristics of *S. mahagoni* is given which includes vessel and ray-cell dimensions. A classification of mahoganies into 5 groups based on the characters of the rays and their contents is presented. A brief historical account of the early recognition and exploitation of mahogany mentions the Europeans landing in America in 1597 from the Walter Raleigh as the first to become acquainted with it, and cites its use by Spaniards in ships, and its importation into England in 1724 by Capt. Gibbon. It states that in 1753, 520,000 cubic feet was imported from Jamaica and before the recent war about 12,000 tons a year was imported by France, 70,000 by England, and 7,000 by Germany. The tree was introduced into India in 1795 and is now cultivated to a considerable extent. The best grades now come from mountain slopes in southern Mexico, British Honduras, and Guatemala. Strength figures are quoted from Laslett and Sargent.—The following woods which may be sold as mahogany, but which do not come from *Swietenia* are discussed: *Curatella americana* L., *Ratonia apetala* Griseb., *Anacardium occidentale* L., *Simaruba amara* Aubl., *Tabebuia Donnell-Smithii* J. N. Rose, *Khaya senegalensis* A. Juss., *K. grandifolia* C.DC., *Entandrophragma Candollei* Harms., *Dysoxylon Muelleri* Benth., *Soymida febrifuga* Juss., *Eucalyptus botryoides* Sm., *E. marginata* Sm., *E. pilularis* Sm., *E. resinifera* Sm., *E. robusta* Sm., *Juglans regia* L., *Ptaeroxylon utile* Eckle. & Zeyn., *Boswellia* sp., *Persea indica* Spreng., *Myristica* sp., and a number of species of *Cedrela*. Methods of finishing such woods as maple, walnut, locust, poplar, chestnut, and elm to look like mahogany are given as follows: (1) oxide of titanium, potash and gall nuts, (2) infusion of Brazil wood, (3) infusion of logwood, (4) infusion of seed of *Bixa orellana* L., (5) gommagutta or saffron, (6) dilute nitric acid followed by an alcoholic solution of the resin from the fruit of *Daemonorops draco* Blume (dragon's blood), root of *Anchusa tinctoria* L., and aloë.—Thirty-five species of *Cedrela* and their sources are mentioned. The following are discussed in detail: *C. odorata* L. and its varieties, *C. bogotensis* Triana & Planch., *C. fissilis* Vell., *C. guianensis* Juss., *C. inodora* Hassk., *C. sinensis* Juss., and *C. toona* Roxb. The article closes with a page summary of the characteristics in regard to color, odor, taste, hardness, annual rings, specific gravity, and structure of vessels, fibers, wood parenchyma, and rays, which serve to distinguish *Swietenia mahagoni* and *Cedrela odorata*.—*Eloise Gerry*.

6297. RANDALL, C. E. Farming the forest for a pine crop. Amer. Forest. 29: 195-198, 250. 5 fig. 1923.—This article points out the financial value of white pine plantations as paying investments to farmers and to towns, with a warning of the dangers to the crop, and especially of the white pine blister rust.—*Chas. H. Otis*.

6298. RECORD, S. J. The Paraná pine of Brazil. Amer. Forest. 29: 215. 1 fig. 1923.

6299. RECORD, S. J. When we build our house. Sci. Amer. 128: 80-81. 5 fig. 1923.—This popular article gives facts regarding kinds and grades of lumber which should be known by the home builder.—*Chas. H. Otis*.

6300. RECORD, S. J., AND GEORGE A. GARRATT. Cocobolo. Yale Univ. School of Forest. Bull. 8. 42 p., 7 pl., 1 fig. 1923.—The authors identify the wood of commerce under this name with the genus *Dalbergia*, and 3 species, *D. retusa* Hemsley, *D. hypoleuca* Pittier, and *D. granadello* Pittier, indigenous in Panama and the west coast of Costa Rica, Nicaragua, Honduras, and Mexico. Botanical descriptions, macroscopic and minute anatomy of the woods, commercial sources of supply, methods of exploitation, and uses are given. For cutlery handles, no satisfactory substitute for cocobolo has been found. The annual consumption is 80,000 cubic feet.—The dust of the wood in factories causes a skin eruption similar to that caused by poison ivy. From 10 to 20 per cent of workmen are susceptible. The toxic principle is an oleoresin with violent irritant properties capable of producing an inflammatory

condition of the skin of the type of "dermatitis venenata." It is soluble in alkalies but is precipitated by acids. The trouble is rarely of a serious nature and usually responds promptly to treatment.—*H. H. Chapman.*

6301. RHODES, G. H. Perpetuating the redwoods. *Amer. Forest.* 29: 147-152. 5 fig. 1923.—California stands among the leading states in regard to constructive forest laws, having begun to formulate them as early as 1885. Reforestation in the redwood region began in 1843, when the first sawmill was built in Mill Valley; for, as soon as the redwood trees were cut, sprouts sprang from the stumps, and at present there are 10 or more good trees where 1 stood in the virgin forest. Since lumbering began, approximately $\frac{1}{3}$ of the virgin forest area has been cut over and approximately $\frac{1}{4}$ of this has been cleared for farming. At the present rate of cutting, the remaining timber will last 140 years. An increased rate may reduce the time to 70 or 100 years. Second-growth redwood is flourishing on practically all the cut-over land that is not being farmed. The age of this new timber is 1-75 years and there are stands with as high as 130,000 board feet to the acre. While the second growth redwood will not be as large when cut for lumber as are the trees of the virgin forests, the stand will be much more dense and uniform, making the yield per acre greater than the average yield from the virgin forests. Both virgin timber and second growth are protected from loss and fire damage by the owners, individually and through co-operating associations, ably assisted by the counties and the State Board of Forestry. In 1921 the area burned over was 4,260 acres, with a loss of only \$1.04 an acre.—*Chas. H. Otis.*

6302. RICALTON, J. Russian white birch—rare tree of a thousand uses. *Amer. Forest.* 29: 153-154. 2 fig. 1923.—This is a popular article on *Betula alba*, its growth under Russian conditions and its use by the peasantry.—*Chas. H. Otis.*

6303. SCH. Bestimmungen über Walddabtriebe in der Tschecho-Slowakei. [Regulation of cutting in Czechoslovakia.] *Deutsch. Forstzeitg.* 38: 363-364. 1923.—Forest owners who are not operating under a fixed working plan are required to notify the proper officials 4 weeks in advance of intended cutting. Cutting is not allowed in stands less than 60 years old in case of high forest, and 20 years for coppice or coppice-with-standards. The area cut over yearly may not exceed $\frac{1}{10}$ for tracts of high forest under 50 hectares, or $\frac{1}{50}$ for larger tracts; for coppice the limits are $\frac{1}{10}$ and $\frac{1}{50}$, respectively.—*W. N. Sparhawk.*

6304. SCH. Mecklenburgisches Waldschutzgesetz. [Mecklenburg's forest protection law.] *Deutsch. Forstzeitg.* 38: 315. 1923.—Mecklenburg-Schwerin adopted a forest protection law on March 10, 1923. It provides that cut-over land must be restocked within 3 years; existing denuded land suitable for forest production must be replanted; no further forest destruction is allowed; owners of less than 25 hectares of forest may manage it as they please; the owner of 25-100 hectares must secure the approval of the authorities if he intends to cut over more than 4 per cent of the area in any 1 year; and the owner of over 100 hectares must follow an approved working plan, under the guidance of a trained forester, unless he himself can qualify as a forester.—*W. N. Sparhawk.*

6305. SCHNEIDER. Die Buchenschildlaus (*Cryptococcus fagi*) in der Revierförsterei Burgsteinfurt i. W. [The beech scale.] *Deutsch. Forstzeitg.* 38: 305-308. 1923.—The damage resulting from attacks of this insect is discussed, and methods of control are suggested.—*W. N. Sparhawk.*

6306. SEITZ. Fraget die Eichen, wie sie wachsen. [Ask of the oaks, how they grow.] *Zeitschr. Forst.- u. Jagdw.* 54: 321-330. 1922.—The author discusses the retrogression of native oak stands (*Q. pedunculata* and *Q. sessiliflora*) and the problem of preserving and extending good stands. Because of overlapping of sites and flowering periods, hybrid races have been produced. Racial variation studies such as have been made with pine should be undertaken with the oaks. Foresters are concerned chiefly with the dominance of characteristics influencing the habit of the tree, and with selecting and propagating those individuals which express the desired characteristics and can pass them on to their progeny.—*J. Roesser.*

6307. SHOW, S. B., and E. I. КОТОК. The occurrence of lightning storms in relation to forest fires in California. *Monthly Weather Rev.* 51: 175-180. *Fig. 1-4.* 1923.—In the 10-year period 1911-1920, 77 per cent of the fires caused by lightning occurred in July and August, which are also the months of highest temperature. Most storms cause relatively few fires, but as high as 339 fires have been set by a single storm. Well defined areas, "lightning zones," exist where fires are frequently set, in which there is a striking parallelism in heavy storms. A series of maps shows these features.—*E. N. Munns.*

6308. SUDWORTH, G. B. The age of Monterey cypress. *Amer. Forest.* 30: 270-271. 3 *fig.* 1923.—Popular.—*Chas. H. Otis.*

6309. SWEET, C. V. Further experiments in the air-seasoning of Indian timbers and general recommendations as to seasoning methods. *Indian Forest Rec.* 9⁵: 147-226, 241-288. *Pl. 1-6.* 1922.—Natural methods of seasoning timber are possible for most of the important Indian species, though kiln drying is much more satisfactory. Seasoning in the log is generally unsatisfactory because of splitting and checking. The best results are obtained from green conversion if the timber is handled soon after cutting and properly stacked and protected, though many species may be girdled 18 months in advance to facilitate handling. Those that are severely damaged by insects should ordinarily not be treated in this way. When logs can not be sawn immediately, special precautions should be taken to prevent damage, water storage being the best method. Good seasoning depends largely upon the degree of protection given the lumber from sun and wind, and the season of cutting, while the rate varies markedly with the species and with the local climate. Complete data are given for 53 species.—*E. N. Munns.*

6310. TRESCKOW, VON. Forstwirtschaftlicher Rückblick auf das Jahr 1921. [Forest economic review for 1921.] *Zeitschr. Forst.- u. Jagdw.* 54: 257-289. 1922.—The review takes up the economic situation of forest industry in Germany under the following headings: the general economic situation, which in 1921 was one of the darkest in German history; conditions of the construction market; indemnity payments of forest products; the course of lumber prices; the situation in the most important countries exporting lumber to Germany; economic measures, including the problem of increasing the cutting budget; the economic situation in East Prussian forests; organization and legal questions; silvicultural questions, mainly centered upon the discussion of the continuous management system, which is beginning to receive the eager attention of private owners; the oak tan-bark question; secondary forest products; and a financial statement and summary of Prussian forests. In 1918 expenditures amounted to 39 per cent of receipts; in 1919, 34; in 1920, 13; in 1921, 34, and in 1922, 42 per cent. Through the Versailles treaty 636,000 hectares have been lost, the present area of the Prussian state forests being 2,416,008 hectares. Numerous tables are given.—*J. Rocser.*

6311. VANSELOW. Wirtschaftsziele und Wirtschaftsverfahren im Hochspessart. [Aims and methods of management in the Upper Spessart.] *Forstwiss. Centralbl.* 45: 1-12, 53-63. 1923.—The objects and principles of management of the "High" Spessart from 1666 to the present time are described. This division of the Spessart forest contains 19,927 hectares, and the stand consists of hardwoods chiefly (80.4 per cent), including oak (17.3 per cent) and beech (63.1 per cent). The old oaks, 300-800 years old, which are famous sources of cabinet wood, are the result of the early form of management. The large-crowned oaks were left to form a forest cover and furnish mast, while the more slender, small-crowned oaks and the beech were taken out for the construction of castles and for firewood. Except for a few pure oak stands starting early in the 17th century, there was little reproduction of oak, hence the present scarcity of oak timber between 120 and 300 years old. About 1800 the silvicultural system was changed, using a form of shelterwood cutting, with an 80-year rotation for beech, later extended to 120-130 years. Natural reproduction of oak did not follow, but considerable was planted. In the late 1870's a selection method was adopted. For various reasons there was not sufficient young timber in the stand for this to be successful,

and the careless and destructive methods of logging and skidding destroyed a great deal of the reproduction which started. A strip- or "border"-cutting system, using the shelterwood method, is recommended. This will secure immediate natural reproduction of beech, and any openings should be planted with conifers.—*W. N. Sparhawk.*

6312. VORKAMPFF. *Baumhöhenmesser*. [A tree hypsometer.] *Deutsch. Forstzeitg.* 38: 244-245. 1923.—The instrument described is very simple to make, easy to use, yet sufficiently accurate. It does not require measurement of the distance between tree and observer.—*W. N. Sparhawk.*

6313. WILSON, ERNEST H. *Northern trees in southern lands*. *Jour. Arnold Arboretum* 4: 61-90. 1923.—The paper deals with the introduction of trees of the northern hemisphere, chiefly North American and European, into South Africa, Australia, and New Zealand. After some remarks on the forest wealth and the forest problems of the southern lands, the behavior of northern soft-wood trees in the southern hemisphere is discussed. The most valuable is *Pinus radiata* D. Don, though it is of little importance in its native country; in most parts of the southern hemisphere where it has been planted it grows rapidly and yields 3 crops of merchantable timber per century. Other pines which have proved of value are *P. pinaster* Ait., *P. pinea* L., *P. canariensis* Smith, *P. longifolia* Roxb., *P. ponderosa* Dougl.; many of the Mexican pines also are doing well. *Pseudotsuga taxifolia* Brit. is promising in some parts of Australia as is *Larix decidua* Mill. *Cedrus* and several *Cupressus* and *Juniperus* species are growing well and are promising. Of little forestal value are *Abies*, *Picea*, *Tsuga*, *Chamaecyparis*, *Thuja*, *Cunninghamia*, *Cryptomeria* and others. None of the hardwood trees has proved of great importance, except poplar and willow; most others, though successfully used as ornamental and avenue trees, grow too slowly to be of value for forest planting. A chapter on southern trees in northern lands concludes the paper. *Eucalyptus* is named as the only one which has proved of great value in various parts of the northern hemisphere; while many others have been introduced, such as species of *Acacia*, *Grevillea*, *Leucadendron*, *Sophora*, *Araucaria*, *Cordyline*; they are planted chiefly as ornamental trees.—*Alfred Rehder.*

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 6142, 6184, 6197, 6217, 6220, 6225, 6231, 6232, 6233, 6251, 6253, 6373, 6381, 6384, 6392, 6415, 6455, 6456, 6457, 6458, 6480, 6481, 6511, 6533, 6647, 6703, 6704.)

6314. BEAN, R. BENNETT. *Notes on the body form of man*. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 7-19. Williams & Wilkins Co.: Baltimore, 1923.—This paper deals chiefly with stature and sitting height, under the following heads: sitting height throughout the world; standards for stature, sitting height and sitting height index; morphologic index; American whites and negroes, and Filipinos; growth of sitting height; and the relation of sitting height to type. The materials include measurements by the author of 6,219 men, women and children, American whites and negroes, and Filipinos; records of other authors representing about 45,000 persons from 396 groups of peoples throughout the world. Two other groups have been reported by Giuffrida-Ruggeri numbering 44,929 Swedes and 119,571 Spaniards. In both sexes, Europe has the greatest sitting height, the Pacific Islands the least, America and Asia are next to Europe and Africa next to the Pacific Islands. The modal stature of the four great continental masses of peoples is represented by that of Europe and Asia, 165 cm. for ♂ with North America slightly higher, Africa much higher and Central America much lower. The records from Africa are not from the true negroes but are from mixed American, Bantu, Nilotic, Nigerian, etc., and the records from Central America are of Indians mixed with Spanish. The modal stature for ♀ is taken as about 155 cm. The modal standard sitting height for Europe, Asia, and North America is above 85 cm., and for Africa, Central America and the Pacific it is 85 cm. or less for the ♂. It is about 80 for the ♀. The modal sitting height index of Europe and America is about

52.5, of Asia 53.5, and of Africa 48.0-50.0. The sitting height index of the true negro is better represented by that of 9 groups from Central Africa with indices varying from 47.9 to 49.6. The normal standards are given for both ♂ and ♀: (males) stature 165.0 cm., sitting height 85 cm., sitting height index 52.5; (females) stature 155.0 cm., sitting height 80 cm., sitting height index 53.5. The morphologic index is a number representing the percentage difference between racial means and a standard taken as a basis for computing the percentage difference. This standard should be as near the average of the 4 great masses of peoples as possible with present knowledge; it may have to be revised and may change in the course of time. The morphologic index may be used with any factor, either actual measurements or indices. The most distinctive characteristic of the morphologic index for stature is the low index for Central America and the Pacific. For sitting height the morphologic index is high for Europe, Asia, and North America, and low for Central America. The morphologic index for the sitting height index is high for Asia and extremely low for Africa. In the sitting height index for outlying groups, the lowest index is among the Australians and the highest among the Eskimos. Closely related to the Australians are the Negroes, Negritos, Melanesians, and East Indians; and closely related to the Eskimos are the Siberians, Chinese, Ainos, and Pigmies of Africa. A low index relates to the negroes except in the case of the Pigmies, and a high index to peoples of low stature who live under adverse conditions. The stature of the American whites and negroes is about the same, but that of the Filipinos is 10 cm. less. The sitting height of the three groups is different, the negroes being nearer the Filipinos than to the whites. The sitting height index is the same for the whites and Filipinos but it is lower for the negroes. The negroes are hybrid Afro-Americans with a preponderance of white blood. The Filipinos are from all parts of the Philippines, with a considerable Negrito blood but with a larger proportion of Chinese and European. The Chinese and Negrito neutralize each other because the former has a high sitting height index and the latter a low one, therefore the index is the same as for the European or white. The sitting height index is lowest in girls between the ages of 12 and 14, and in boys between the ages of 14 and 16. This is the period when the lower extremities are ceasing to grow rapidly and the torso or bust is beginning to grow rapidly. The bust of the girls is absolutely longer than that of the boys between the ages of 10 and 15. The period of most rapid growth in sitting height in girls is from 11 to 13 years, and in boys from 14 to 16 years; the girls are precocious and the boys retarded. The Asiatic seems to have a short youth and long adolescence, because the lower extremities are retarded early in their growth, and the bust is accelerated early and retarded late in its growth. The adult Asiatic has a long torso and short lower extremities. The African seems to have a long youth and a short adolescence, because the lower extremities grow to a late age and the rapid growth of the sitting height is late and short. The adult African has a short torso and long lower extremities. The European is intermediate between the Asiatic and African in the growth of both the torso and lower extremities. This varies with the type. Selected cases are given to show some extreme conditions that may be found among the American whites and negroes, and Filipinos. Then are separated those below 170 cm. stature, and finally each of the 3 primary types is subdivided into 3 other types. The records are all of ♂. The differences are readily seen, and, throughout the negro is discernible by reason of the lower index. Three types may be found among the people of any group but any clear separation of individuals is difficult and more or less relative. The extreme cases are easily discerned, but the intermediate grades are more difficult to detect.—*R. Bennett Bean.*

6315. BELL, ALEXANDER GRAHAM. Saving the six-nippled breed. *Jour. Heredity* 14: 99-111. 10 fig. 1923.—A summary is presented of Bell's experiments to produce a multi-nippled, twin-bearing strain of sheep. At the time of his death Bell had a flock that always bore twins and triplets, but whether the character is hereditary had not yet been satisfactorily proved.—*R. C. Cook.*

6316. BENDERS, A. M. Onze constitutie. [Our constitution.] *Genetica* 2: 301-322. 1920.—The author discusses the Galenian theory of disease and its influence during centuries,

until Virchow in 1894 brought forth the organic (cell) theory; the effect of the latter on the advancement of the knowledge of diseases is considered.—The author accepts Lubarsch's definition of disease, "that tendency of the organism, which determines the manner of reaction to stimuli;" and of disposition, "that tendency of the organism, which enables external influences to act as stimuli." For example, scrophulous constitution; the disposition allows the tubercle bacillus to gain a foothold, and the constitution determines that the patient becomes scrophulous.—The theory of an hereditary constitution, determined at fertilization of the egg-cell, as advanced by Tandler, Hart and Hijmans van den Bergh, is discussed.—Certain diseases are recognized as hereditary. These, if appearing regularly in the same manner in the same family, may be due to 1 factor, as for instance amaurotic idiocy. About 60 abnormalities (diseases) are listed as hereditary.—The advance of investigations during the last 10-15 years is noted. Experiments of Goldmann, Arnold and others regarding cell functions, cell fermentations, permeability of cell walls, excretion of cells, degeneration of cells, etc., are discussed. Degeneration giving rise to organic nerve diseases has been but little studied. The accumulation of waste in the cells and the increased function of the cell is very dangerous for the cell. Diseased conditions might also be caused by absence of cell functions.—Dietetics are corrective methods against such conditions.—The theory of determination of hereditary influences in the cell is next discussed, including nuclear and cytoplasmic inheritance. Small differences, enlargements, etc., in localization may appear in the different members of a family.—The author believes that the possibility of small changes in the egg plasma is greater than changes in chromosomes during nuclear division, and that "localisation" influenced by plasma, as the seat of the material, is more logical than that it should be influenced by nuclear chromosomes.—The constitution then has its origin in the germ and is a problem of heredity.—*Peter J. Klaphaak.*

6317. BENEDICT, R. C. Artificial varieties under natural conditions. Jour. Heredity 14: 115-116. 1 fig. 1923.—A horticultural variety (Whitmani) of the Boston fern has grown wild in Florida for 12 years, maintaining its typical form with no greater change than would be expected under unfavorable greenhouse conditions. The original plant has spread until about 2 square rods of ground are irregularly covered.—*R. C. Cook.*

6318. CHEVALIER, A. Le cotonnier Pima. [Pima Cotton.] [Rev. of: KEARNEY, THOMAS H. Heritable variations in an apparently uniform variety of cotton. Jour. Agric. Res. 21: 227-242. 1921.] Rev. Bot. Appl. et Agric. Coloniale 2: 24, 25. 1922.

6319. CLARK, HUBERT L. The distribution and derivation of some New England echinoderms. Amer. Nat. 57: 229-237. 1923.—There are sufficient data on the distribution of 40 of the 46 species of echinoderms known to occur on the New England coast to permit an interpretation of their derivation. Thirty-two of these are of northern origin and 8 of southern origin. The data on the distribution of these echinoderms indicate that: (1) they have a northern origin with few exceptions; (2) they have little tendency to form endemic species or varieties on these coasts; (3) they are representatives of genera that in warmer seas become differentiated into numerous constant forms. Some details are given of the distribution and place of origin of *Strongylocentrotus dröbachiensis*, *Crossaster papposus*, *Ophiopholis aculeata*, *Arbacia punctulata*, *Asterias forbesi*, *A. vulgaris*, *Leptosynapta inhacrens*.—*Geo. T. Hargitt.*

6320. CONKLIN, E. G. Problems of organic adaptation. Rice Inst. Pamphlet 8: 299-380. 1921.—The 3 lectures which constituted this course at the Rice Institute are entitled respectively: fitness in the living world; the mechanism of adaptation; mechanism, vitalism, and teleology.—*J. R. Schramm.*

6321. DAVIS, B. M. Species, pure and impure. Science 55: 107-114. 1922.—The conception of species as modified by extended knowledge is discussed. The author states that chiefly as the result of genetical studies of the near present there are 2 conceptions of species: (1) The pure species as conceived by Darwin and others, which, as expressed in the

terminology of the modern geneticist, is homozygous for all genes responsible for the species characters other than those of sex or sex-linked characters. For the latter the germplasm is heterozygous in either the ♂ or ♀ individual, at least where animal forms are under consideration. The author does not agree with Lotsy's definition: "A species is the total of all individuals of the same hereditary composition, forming but one kind of reproductive cell," since it calls for the absolutely pure race, almost an abstraction in higher animals and plants. (2) The impure species, the germplasm of which in the diploid condition carries different sets of genes affecting characters other than those associated with sex, and which therefore is heterozygous. It is therefore clearly hybrid in its genetical constitution, but frequently shows little or no evidence of segregation, thus breeding true or nearly true to type. This may be due to: (a) the death, sterility, or the failure of maturation of classes of gametes, eliminating the possibilities of development of whole groups of segregates; (b) the failure of gametes to produce in conjugation viable zygotes due to diverse conditions, among them the presence of lethal factors.—Thus are left favored gametes, which carry between them those genes which in combination reproduce the impure heterozygous germinal constitution of the parent stock.—As an example of an impure species the author refers to *Oenothera Lamarckiana* used by de Vries in his explanation of the mutation theory and to *O. Neo-Lamarckiana*, an impure synthetic species selected by selfed seed for 6 generations by the author from hybrid ancestry, and which agrees in all essential characteristics with *O. Lamarckiana*. The author states that most species of *Oenothera* are impure. One, however, a line of *O. franciscana*, he regards as most nearly a pure *Oenothera* species. It gave 87.3 per cent of germination. Among 1,425 plants (52 of which died as seedlings) no exceptions to type were present, and crosses with *franciscana* pollen showed that the F₁'s were uniform, indicating that pollen was genetically alike. Cytological studies showed a regular pairing at meiosis.—The author treats in condensed form the use of the theory of lethals in *Oenothera* and *Drosophila* hypotheses, showing the similarity of one to the other. He then discusses the appearance among certain plants of: self-sterility, e.g., chicory; free or open cross-pollination, e.g., corn; and consequences of inbreeding, e.g., *Crepis*.—Another type of impure species is mentioned as existing only in certain types or groups of plants, e.g., violets, blackberries, tree fruits, etc., perpetuated by vegetative means.—The author concludes with the question as to whether the impure species should be grouped for convenience as collective species.—*Peter J. Klapaak*.

6322. DUCK, RUSSEL W. Colors of short-horn cattle. Jour. of Heredity 14: 65-75. 6 fig. 1923.—Tracing color-inheritance by means of the data contained in the Herd-books of the Short-Horn Breeder's Association brings in many chances of error, because of inaccurate registration. In tracing 11,685 matings, and corresponding with breeders in doubtful cases, it is concluded that red is the basic color in Short-horns, and that white is "due to the absence of any color factor." Red-and-White represents the red factor in the heterozygous condition, in the absence of the roan "extension factor." Roan is considered to be due to the presence of an extension factor when the factor for red is heterozygous. A table is included giving the data obtained in tracing these matings.—*R. C. Cook*.

6323. EAST, E. M. Weatherwax on maize endosperm. [Rev. of: WEATHERWAX, PAUL. A rare carbohydrate in waxy maize. Genetics 7: 568-572. 1922 (see Bot. Absts. 12, Entry 3281).] Science 57: 416-418. 1923. [See also Bot. Absts. 12, Entry 6337.]

6324. ELLINGER, T. Metoder til Analys af Stamtavler med Hensyn til Indavl og Slaeftskab. [Methods for analyses of genealogies in respect of inbreeding and relationship.] Nordisk Jordbrugsforskning 1921: 49-66. 3 fig. 1921.—The author discusses Pearl's coefficients of inbreeding, relationship and partial inbreeding indices and suggests certain modifications for the purpose of bringing all measurements of inbreeding and relationship on the same scale. He points out the desirability of coefficients of total inbreeding and relationship and a total relationship inbreeding index, the last to measure the proportion of the inbreeding that is due to relationship between the sire and dam.—*Sewall Wright*.

6325. ENGLEADOW, F. L. **The inheritance of glume length in a wheat cross (cont.).** *Jour. Genetics* 13: 79-100. 1923.—Previous work carried through the F_2 generation [see *Bot. Absts.* 8, Entry 253] was continued through the 2 succeeding generations but only upon glume length of the Polish wheat of the Polish-Kubanka cross. The material and methods were scrutinized with great care but nothing was found to warrant a conclusion different than the one previously announced,—that the extracted Polish glume length in all cases was approximately 20 per cent shorter than the parental glume length. Further studies in the inheritance of solidness of straw did not show that these results had to do with “shift” in mean glume length.—Although double fertilization occurs in wheat no evidence could be found of the presence of more than 1 endosperm type in the F_2 endosperms borne by the F_1 plant. It is presumed that the endosperm is maternal in its nature.—An attempt was made to explain the nature of “shift” in glume length by the multiple factor hypothesis but in this cross this was found impossible although it is still a matter of uncertainty whether the phenomenon of “shift” is distinct from multiple factor action.—*L. R. Waldron.*

6326. ERNST, ALFRED. **Chromosomenzahl und Rassenbildung.** [Chromosome number and species formation.] *Vierteljahrsschr. Naturf. Ges. Zurich* 67: 75-108. 1922.—A summary and discussion are presented of the literature on the origin of new types of plants differing in chromosome number from the stock from which they came as a result of: (1) mutation, (2) action of outer influences, (3) hybridization between forms with different chromosome numbers.—*Margaret C. Mann.*

6327. ETHERIDGE, W. C., W. H. EYSTER, and L. J. STADLER. **A genetic analysis of maize.** *Missouri Agric. Exp. Sta. Bull.* 197. 69 p. 1922.—Brief notes are given on the inheritance of zigzag culms and scarred endosperm in maize, and also on the relative frequency of crossing-over in megasporogenesis and microsporogenesis. Papers dealing with these several subjects in detail have appeared elsewhere [see *Bot. Absts.* 12, Entries 1783, 3167, 3168].—*J. H. Kempton.*

6328. FAIRCHILD, MILTON. **Pure science work in higher eugenics.** 2nd Internat. Congress Eugenics. Vol. II. *Eugenics in race and state.* 358-360. Williams and Wilkins Co.: Baltimore, 1923.—Educationists throughout the country are looking to students of science, having to do with human life, for “adequate and reliable generalizations for use in deciding what education ought to be given boys and girls as a preparation for their lives as fathers and mothers in the homes of the nation.”—*Charlotte Elliott.*

6329. GOWEN, J. W., and M. R. COVELL. **Studies in milk secretion. XII. Transmitting qualities of Holstein-Friesian sires for milk yield, butter fat percentage and butter fat.** *Maine Agric. Exp. Sta. Bull.* 301. 253-308. 2 fig. 1921.—A study is reported of Holstein-Friesian advanced registry sires to determine their ability to transmit milk yield, butter fat percentage, and butter fat to their offspring. One hundred and eleven sires were found to have had 2 or more tested daughters from tested dams, all of which had met advanced registry requirements. The transmitting ability of the bulls is measured by the increase or decrease shown by the daughters (after making suitable age corrections). The names and numbers of the sires, the number of daughter-dam pairs, the net difference, and a condensed record (by quartiles), showing the relative level within the breed of the individual dams and daughters, is presented for each of the characters studied. It is shown that only 11 of the sires increased their daughter's yield 2 times its probable error and only 3 lowered their yield a similar amount. No significant differences in inbreeding, relationship, or in the ancestry of these animals could be found. Essentially similar results were found for butter fat percentage and production. A comparison of transmitting ability of sires and sons gave no clear evidences of heredity. A study of 2 major groups of sires, those with daughters superior to their dams in both milk yield and butter fat percentage, and those inferior in both respects yielded no significant differences in inbreeding, relationship of sire and dam, or ancestry. A comparison of both groups with random sires, none of whose daughters had met advanced registry requirements, again brought out no important differences in ancestry.—*Sewall Wright.*

6330. GUYER, M. F. **Internal secretions and acquired characters.** [Rev. of: CUNNINGHAM, J. T. **Hormones and heredity.** $xx + 246$ p. Macmillan Co.: New York, 1921.] Jour. Heredity 14: 136-138. 1923.—The reviewer points out that Cunningham uses the term "hormones" "in a much wider sense than is warranted by our actual knowledge."—R. C. Cook.

6331. HARRIS, J. ARTHUR, AND H. R. LEWIS. **The correlation between the time of beginning and the time of cessation of laying in the first and second laying year in the domestic fowl.** Genetics 8: 37-74. 10 *diagr.* 1923.—Records on 443 White Leghorns made during their first 2 years at the Vineland Contest are reported. Correlation coefficients are reported as follows: (1) time of beginning laying on the 2 years, $r = .2295$; (2) time of cessation of laying on the 2 years, $r = .5020$; (3) time of beginning to lay the 1st year and cessation of laying the 1st year, $r = .2439$; (4) time of beginning to lay the 2nd year and time of cessation of laying the 2nd year, $r = .3969$; (5) the time of cessation of laying the 1st year and beginning to lay the 2nd year, $r = .5007$; and (6) time of beginning to lay the 1st year and ceasing to lay the 2nd year, $r = .1561$. The correlation factors indicate the existence of a positive relationship in the 6 groupings made.—F. A. Hays.

6332. HERIBERT-NILSSON, NILS. **Kritische Betrachtungen und faktorielle Erklärung der Laeta-velutina-Spaltung bei Oenothera.** [Critical considerations and factorial interpretation of the laeta-velutina segregation in Oenothera.] Hereditas 1: 312-342. 8 *fig.* 1920.—A study of the literature regarding the *laeta-velutina* segregation (or similar segregations) in *Oenothera* showed that de Vries obtained from the *velutina* ♀ × *laeta* ♂ crosses, only *laeta*. Renner, however, obtained from the same cross mainly *O. Lamarckiana* and only a small number of *O. laeta*. The author repeating the cross found neither *laeta* nor *Lamarckiana* alone, but mainly a 3rd distinctive type. He believes that both de Vries and Renner obtained this same type, but that both classified it according to specific characters which proved their theories. The new type was *Lamarckiana*-like in the vegetative parts and *biennis*-like in the floral parts. The author calls this type *ambigua*. *Ambigua* buds are smaller and barrel-shaped in contrast with *Lamarckiana* buds, which are large and cone-shaped. They are similar to *O. biennis* buds, but larger and coarser and colored reddish-brown. The flowers vary in size between those of F_1 *laeta* × *biennis*. The flower shape is most like *biennis*, the style is short, the floral internodes (inflorescence) are shorter, and the fruits are reddish-striped and more horizontal than in *Lamarckiana*. The vegetative parts are like *Lamarckiana*, the branching is more erect. About $\frac{1}{4}$ of the F_1 of the *ambigua* type were very much like *Lamarckiana*, with only a slight difference in flower size. Some have very large flowers and a very long pistil, others have shorter flowers and shorter pistils which do not reach above the stamens.—Besides plants of the *ambigua* type, *laeta* plants were obtained by the author in his cross. In all crosses of this type *laeta* appears in very small numbers.—de Vries finding "only *laeta*" must have classified *ambigua* and *Lamarckiana* as modified *laeta*, because he mentions that "some *laeta* were *Lamarckiana*-like." Renner on the other hand, finding mostly *Lamarckiana*, mentions difference in flower size, grouping therefore *ambigua* under *Lamarckiana*.—The author regards flower size as an important factor, which up to the present has usually been left out of consideration. In the cross *biennis* × *Lamarckiana* small flower-size is dominant over large. *O. biennis* contains therefore the factor *B* (small flower size). The F_1 is then small-flowered independent of type. F_2 as found by both Renner and the author is mainly small-flowered, in 1 F_2 , 33 small-flowered, 14 large-flowered were obtained.—Besides flower size, *B* influences also type of branching, length of internodes of inflorescence, direction of buds and fruits, and form of buds and flowers. It is thus a complex factor. Renner's "albicans complex" influencing only white veins has no meaning, as *O. Lamarckiana* has white veins. It does not influence other characters. *r* in *Lamarckiana* (factor for white veins) as opposite to *R* (red veins) is therefore the same as the "albican complex."—The author, not agreeing with Renner's homozygotic theory (in which the homozygotes are lethal), accepts the presence of 2 factors, *L* and *V*, which show strong repulsion for one another, so that no "positive" homozygotes are formed. *Lamarckiana* is then *LlVv*, as only the gametes *Lv* and *lV* are formed; *biennis* is *llvv*. *O. biennis* × *Lamarckiana* gives

then the following combinations: $lv \times Lv$ and $lv \times lV$ or Llv and lVv , which, being heterozygotic, are viable. The acceptance of the factor B in this scheme as belonging to *biennis* explains the appearance of *ambigua* in the cross *laeta-velutina*. The author claims that his explanation by factorial (Mendelian) inheritance does away with the de Vriesian hypothesis of 2 lethal factors and a special mutation process.—The *blandina (velutina)* and *simplex (laeta)* types obtained by de Vries from selfed *Lamarckiana* can be explained by the author's hypothesis of 2 factors, L and V , which may sometimes combine (about once in 100,000 times), but which are highly repulsive to one another. The gametes are formed in the following ratio: 1 LV : 100,000 Lv : 100,000 lV : 1 lv . All positive combinations ($\frac{1}{2}$ of all combinations), i.e., those containing either LL or VV or both, are lethal; the negative ones are vital.—The author states finally that most if not all of the differences in observations on *Oenothera* phenomena are due to the terminology used. Mutation is complicated segregation (repulsion, homozygote elimination, heterogamy); complex inheritance is pleiotrophy; nuclear chimaera means the formation of pure gametes, and abnormal ratios are due to certation, i.e., a different power of growth of genotypically different pollen tubes. An English summary concludes the paper.—*Peter J. Klaphaak.*

6333. HERTWIG, PAULA. Der bisherige Stand der erbanalytischen Untersuchungen an Hühnern. [The present status of genetic investigations in poultry.] Zeitschr. Indukt. Abstamm.- u. Vererb. 30: 183-254. 1923.—This paper furnishes a very complete review of work done on the many phases of poultry breeding. Most of the important genetic work on this problem has been presented in comprehensive form. The paper furnishes a valuable summary and reference list.—*F. A. Hays.*

6334. HUNT, H. R. The Allegheny College birth rate. Jour. Heredity 14: 50-60, 139-144. 1 fig. 1923.—In this statistical study of the birth rate of the graduates of Allegheny College it develops that "the birth and marriage rates have remained fairly constant for graduates of Allegheny College (classes of 1870-1899), but the group has probably fallen somewhat short of producing enough children to replace itself."—*R. C. Cook.*

6335. JOHNSON, ROSWELL H. Mate selection. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics, and the family. 416-425. Williams & Wilkins Co.: Baltimore, 1923.—Assortive mating in man accentuates attributes, tending to confine high attainment to certain strains, and to restrict defects to other strains. Mate selection may be influenced by the possession of a particular quality, in which case the intensity of that quality among descendants may eventually come to lie outside the normal range of variation of the race. Matings may be the result of preference, though the precise reason for the choice may or may not be recognized by the suitor. The range of effective mating can be restricted by differential death rates of the sexes, geographical and social segregation, celibacy, sterility, and delayed marriage.—The importance of beauty is frequently overemphasized. Stability, persistence, judgment, etc., in women are likely to be undervalued by men. Public record of the results of mental tests is desirable as an aid to intelligent choices of mates. The racial usefulness of superior persons consists largely in having offspring, which will pass on their excellent qualities to posterity. Superior women should not persistently insist on excessively high qualifications in a mate, for such an attitude may entirely prevent their marrying. Sterility resulting from venereal disease is probably on the whole eugenic, because of its greater frequency among mentally inferior persons. Laws restricting the diffusion of the knowledge of birth control are undesirable, for such control should be applied on a eugenic basis.—*H. R. Hunt.*

6336. KAHN, E. [German rev. of: FUCHS, W. Psychiatrischerbbiologische Korrelationsphänomenologie. (Study of psychiatric-genetic correlation phenomena.) Zeitschr. f. Ges. Neurol. u. Psychiatrie 69: 153-168. 1921.]—Zeitschr. Indukt. Abstamm.- u. Vererb. 30: 139. 1922.

6337. KEMPTON, J. H. **Erythrodextrin in maize.** [Rev. of: WEATHERWAX, PAUL. A rare carbohydrate in waxy maize. *Genetics* 7: 568-572. 1922 (see Bot. Absts. 12, Entry 3281.) *Science* 57: 556-557. 1923. [See also Bot. Absts. 12, Entry 6323.]

6338. KNOFF, S. A. **Eugenics in its relation to the tuberculosis problem.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 298-308. Williams & Wilkins Co.: Baltimore, 1923.—While education and sanitation have done much to lower the tuberculosis death rate from environmental causes, thousands of tuberculous individuals still die annually in spite of treatment, education, etc.—Direct bacillary transmission of tuberculosis occurs so rarely that the disease is no longer considered hereditary. Tuberculous predisposition may, however, be inherited due primarily, the writer thinks, to the mingling of the blood in the maternal and foetal circulation.—Any inherited predisposition becomes manifest and mortality is highest between the ages of 18 and 35. Since this is also the period when marriages are most frequently contracted it is at this period that the importance of eugenics in its relation to the tuberculosis problem should be considered.—When 2 individuals whose physique indicates a tuberculous tendency marry their offspring rarely escape the disease; when the mother only is predisposed the children may or may not be weak and predisposed. The writer recommends obligatory examination of individuals wishing to marry, instruction in parenthood, and birth control clinics such as are held in Holland. He believes that if the tuberculosis problem in the U. S. A. were attacked from the eugenic as well as from the environmental side there would be hope of the absolute eradication of the disease, but that without judicious scientific birth control tuberculosis will not be controlled.—*Charlotte Elliott.*

6339. LIDBETTER, E. L. **Pedigrees of pauper stocks.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 391-397. Williams & Wilkins Co.: Baltimore, 1923.—There is, in the general population of England, a well-defined pauper group characterized by varying degrees of mental disorder, low grade incompetence, and lack of morality. This pauper group shows a remarkable degree of assortive mating which is fostered by the Poor Law system.—*H. R. Hunt.*

6340. LINDSTROM, E. W. **Hereditary characters of maize XIII. Endosperm defects—sweet defective and flint defective.** *Jour. Heredity* 14: 127-135. 5 fig. 1923.—Two distinct types of heritable endosperm defects of maize were isolated by inbreeding in Golden Bantam sweet corn and in Yellow Flint corn. Data for 3 generations prove that the sweet-defective kernels of the Golden Bantam variety are excessive in inheritance and are conditioned by a simple, Mendelian factor. A new mutant type of endosperm defect arose during the progress of the experiment. The endosperm defect discovered in the flint corn was also recessive and due to a single factor. This factor is completely linked with white or albino seedlings.—*E. W. Lindstrom.*

6341. LIPPINCOTT, W. A. **Genes for the extension of black pigment in the chicken.** *Amer. Nat.* 57: 284-287. 1923.—Crosses were made to discover whether Dunn's E^m factor for the extension of melanic pigment in poultry is identical with the E factor reported by Lippincott in Anadalusians. A blue-splashed Anadalusian male was mated with Light Brahma, Buff Orpington, Rhode Island Red, and Lakenvelder females. All offspring were blue. This fact indicates that factors E^m and E are not identical and that the blue-splashed Anadalusian ♂ carried factor E^m while the females carried factor E .—*F. A. Hays.*

6342. LOTSY, J. P. [Dutch rev. of: (1) ÅKERMAN, Å. **Untersuchungen über Bastarde zwischen Epilobium hirsutum und E. montanum.** (Investigations on hybrids between *Epilobium hirsutum* and *E. montanum*.) *Hereditas* 2: 99-112. 1921 (see Bot. Absts. 9, Entry 1290). (2) RASMUSON, H. **Beiträge zu einer genetischen Analyse zweier Godetia-Arten und ihrer Bastarde.** (Contribution to a genetic analysis of two *Godetia* species and their hybrids.) *Hereditas* 2: 143-289. 1 pl., 29 fig. 1921 (see Bot. Absts. 9, Entry 1366.) *Genetica* 5: 79-80. 1923.

6343. LOTSY, J. P. [Dutch rev. of: BEEBE, WILLIAM. **A monograph of the pheasants.** Vol. 2. 269 p., 48 pl. (24 col.), 4 fig., 5 maps. H. F. and G. Witherby: London, 1921.] *Genetica* 5: 83-87. 1923.

6344. LOTSY, J. P. [Dutch rev. of: BEEBE, WILLIAM. **A monograph of the pheasants.** Vol. 3. 204 p., 45 pl. (24 col.), 4 maps. H. F. and G. Witherby: London, 1921.] *Genetica* 5: 88. 1923.

6345. MANDEKIĆ, V. **Die Vererbung einiger Eigenschaften bei Mais.** [The genetics of several maize characters.] *Zeitschr. Pflanzenzucht.* 9: 23-34. 8 fig. 1923.—Comparisons of the progenies from different selections of Croatian Round corn showed length of ear to be inherited, conforming well with Galton's law. Correlation was observed in the material studied between number of rows and length and circumference of ear, yield and length of ear and number of rows, length of ear and circumference and number of rows, circumferences of ear and of cob, and number of rows and circumferences of ear and of cob. The use of a pure line is considered essential in studying inheritance of characters in corn.—*H. M. Steece.*

6346. MANGELSDORF, P. C. **The inheritance of defective seeds in maize.** *Jour. Heredity* 14: 119-125. 5 fig. 1923.—The extensive inbreeding of corn for the purpose of isolating pure lines has brought to light a large number of defective seeds in which the endosperm is partially or completely aborted or in which the seed fails to go into the resting stage. These characters have been found in more than 30 American and several foreign varieties. Breeding experiments show that there are many distinct genetic types of this abnormality.—*P. C. Mangelsdorf.*

6347. MjøEN, JON A. **Harmonic and disharmonic race crossings.** 2nd Internat Congress Eugenics. Vol. II. Eugenics in race and state. 41-61. Williams & Wilkins Co.: Baltimore, 1923.—The writer cites examples to show that crossings between widely different races such as the Lapps and Norwegians may lower both the physical and mental level. From results of crossings between the races of rabbits he concludes that there are many striking analogies between the defects resulting from race crossing among humans and those resulting from race crossings in animals. While the author does not wish to draw conclusions from one race crossing he states that experience to date points decidedly in one direction and that until we have more definite knowledge of the effects of race crossings it would be wise to avoid crossings between widely different races.—*Charlotte Elliott.*

6348. MOIR, W. W. G. **Clonal type selection in sugar cane.** *Facts about Sugar* 16: 133-135, 172-173, 232-233. 1923.—Type mutations, which may be isolated in pure lines, exist in sugar cane. The behavior of the progeny is the basis for the study of these type selections. The 1st field selection is of primary importance as this isolates the pure lines. Type selection of cane has given quick and surprising results in Hawaii.—*C. W. Edgerton.*

6349. NAGAI, ISABURO, and SHUICHI SAITO. **Linked factors in soy-bean.** *Japanese Jour. Bot.* 1: 121-136. 1923.—In some genetic studies on soybeans there appeared a mutant which lacked pubescence. This character was found to be dominant over the presence of pubescence. The factor for glabrousness, *P*, was linked to the factor *M*, for mottling in the seed coat, with a percentage of crossing over of 18.12. Glabrousness is accompanied by lessened vigor of growth and reduced assimilative activity.—The following factors for seed coat colors and patterns have been studied: *C*, responsible for the formation of the chromogenic substance in the seed coat; *c*, same action as *C*, but to a slight extent. *O*, responsible for converting the chromogenic substance to brown pigments; *o*, same action as *O*, but to a deeper brown. *R*, responsible for converting the chromogenic substance to black pigment (anthocyanin); *r*, no effect. *M*, responsible for the development of the black pigment in a mottled pattern; *m*, no effect. *H*, responsible for fully inhibiting the formation of the chromogenic substance in the seed coat; *h*, no effect. *I*, responsible for partially inhibiting

the formation of the chromogenic substance; *i*, no effect. *K*, responsible for partially inhibiting the pigment, giving rise to the "patched" pattern; *k*, no effect. *G*, responsible for the formation of chlorophyll pigments in the seed coat; *g*, responsible for the formation of yellow pigments in the seed coat.—Certain factor interactions were noted. Thus, *R* produces a full black seed coat in the presence of *C*, but only to a certain extent with *c*; likewise, *M* gives a full expression of black mottling with *C*, but this action occurs only to a slight extent with *c*.—*C. M. Woodworth.*

6350. NOHARA, SIGEROKU. Genetical studies on *Spinacia*. Japanese Jour. Bot. 1: 111-120. 1923.—Crosses were made between *Spinacia oleracea* Mill. and *S. spinosa*. In the former, the persistent bractlets covering the fruits are smooth; in the latter, horned. Horned fruits and smooth fruits were found to be simple allelomorphs, the horned character being dominant, and a 3:1 ratio being obtained in F_2 .—The sex ratio of the plants used approached closely 1:1. The author inclines to the belief that *S. spinosa* is the species-type and *S. oleracea*, its variety.—*C. M. Woodworth.*

6351. OSTENFELD, C. H. Experimentelle Undersøgelser over Artsdannelsen hos Slaegten Høgeurt. [Experiments with creation of species in *Hieracium*.] Nat. Verden 5: 400-417. Fig. 1-4. 1921.—In 1900 a multitude of species and forms were described and it was shown by Schultz that they might be hybridized, and by Mendel that the hybrids were of constant type (did not "mendelate"). Directed by the demonstration of agamy in *Antennaria* by Juel and in *Taraxacum* by Raunkiaer, the author "agamised" the flowers of several forms of *Hieracium* and found the seed developing without fertilization, giving a progeny identical with the mother plant. The 3 species of the subgenus *Stenotheca* investigated do not develop agamic seed, and at least *H. venosum* develops the oocyte normally. Of 70 species of *Archhieracium* all but a few were apogamic, and the oocyte had the double number of chromosomes. Of *Pilosella* some species are normal, others develop agamic seed and have an abnormal oocyte. *H. excellens*, the anthers of which are sterile, develops agamic seed, and such is also the case in *H. aurantiacum* following agamisation. But if *H. excellens* is fertilized with pollen from *H. aurantiacum* the F_1 shows some individuals identical with the mother as well as several types of hybrids. In F_2 each of these types breeds true, though the occurrence of sterile hybrids is frequently noted. In *H. rigidum*, an agamic and constant species, 2 new types have appeared, 1 rather weak, the other stout and fertile, which may be termed apogamic mutations. In both subspecies hybridization is the original cause of the polymorphism, while the apogamy will secure the constancy of the forms.—*Ernst Gram.*

6352. POLLOCK, HORATIO M. Eugenics as a factor in the prevention of mental disease. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 322-326. Williams & Wilkins Co.: Baltimore. 1923.—Mental disease in the U. S. A. is discussed as regards cost and loss to the nation, rate of increase, inheritance, and measures for checking its increase. Much evidence exists that Mendelian inheritance of neuropathic constitution occurs, but more comprehensive studies are necessary. Mental disease may occur in almost any type of intellectual or temperamental make-up, as clearly shown during the World War. Psychopathic personalities give way to the common stresses of life; stronger personalities yield only to extraordinary mental strain. It is evident, therefore, that the whole etiology of a case of mental disease must be carefully studied before the related family stock can be safely discredited.—The data collected by the New York State Hospital Commission seem to indicate that slightly more than $\frac{1}{2}$ of ascertained cases have no discoverable hereditary basis. More thorough inquiries might increase the proportion of patients with unfavorable family history, but the significance of the history in relation to the family stock is open to question in many cases.—In 1920, data from the Commissioners' hospitals showed that of 1st admissions 61 per cent of ascertained cases were temperamentally normal and 88 per cent were rated as intellectually abnormal.—The absence of marked abnormalities in individuals prior to the onset of the psychosis cannot be construed as conclusive evidence that there are no hereditary defects in the make-up, neither can the development of the psychosis be taken

as proof of a defective constitution. All the facts in connection with the onset of the mental disorder and previous reactions must be brought together before the constitutional make-up of the patient can be positively determined.—Notwithstanding these and many other complications, there is abundant evidence that mental disorders occur much more frequently in some family stocks than in others, and that prolonged inbreeding of degenerate stocks produces disastrous results.—Three lines of action are suggested: (1) environmental stresses may be lessened and natural resistance strengthened; (2) procreation of defective stock may be checked; (3) procreation of normal stock may be increased. Segregation of the insane is fairly complete, but as only about $\frac{1}{4}$ of the 1st admissions are under 30 years of age on admission, its value in preventing procreation in this group is not as great as would appear when only the number of patients under treatment is considered.—Something can be done to lessen reproduction among the unfit by enlightening public sentiment and by better marriage laws. Marriage of persons with marked intellectual or temperamental abnormalities should be entirely prohibited.—*Horatio M. Pollock.*

6353. RABAUD, ETIENNE. *Developpement compare des produits successifs d'une meme couple.* [Comparative development of successive progeny of the same parents.] 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 303-305. Williams & Wilkins Co.: Baltimore, 1923.—The popular idea that the 1st-born is less well endowed than the other children, rests upon prejudice and inaccurate observation. There are no satisfactory human statistics on this question. The writer worked on mice. The results did not, in general, confirm the popular belief. Several types of crosses were used, the ages and relationships between the parents varying. Each resulting litter was weighed at birth, then regularly for 4 consecutive weeks, and finally at the end of the 3rd month. Insignificant differences existed among the litters. In a general way, the growth of the descendants of a pair, under normal conditions of nutrition, depends upon the constitution of the pair.—*H. R. Hunt.*

6354. RANT, A. *Einige Beobachtungen bei Clitoria ternatea L.* [Some observations on *Clitoria ternatea* L.] Bull. Jard. Bot. Buitenzorg III, 4: 241-246. Pl. 11, 12. 1922.—A preliminary report is presented on the crossing of different forms, white and blue, zygomorphic and peloric, of *Clitoria ternatea*. The author found the blue color and the peloric form to be dominant characters. In the F_2 generation of a cross between plants with dark blue flowers and strains with white flowers, plants with violet flowers appeared. There is also a note on a bud-variation of *C. ternatea* and on the influence of altitude on habit, which is climbing at low, and shrubby at higher altitudes.—*Alfred Rehder.*

6355. RAU, VENKATA. *Inheritance of some morphological characters in Crepis capillaris.* Univ. California Publ. Agric. Sci. 2: 217-242. 2 pl. 1923.—The hereditability of the 3 characters, length of leaf, number of lobes per leaf, and diameter of flower heads, has been studied. Strains showing marked differences in these characters were found to breed true. Accurate classification of F_2 plants from the cross long \times short leaf was difficult because of somatic variability of this character. The inheritance of leaf lobes depended upon the action of 4 sets of genes, which determined respectively (a) the presence or absence of lobes, (b) depth of incisions, (c) number of lobes per leaf, and (d) the development of secondary lobules of the midrib of the leaf into full sized lobes. Crosses involving the number of lobes per leaf indicated that multiple factors were operating as well as in the inheritance for size of flower head. It was found that terminal flower heads of a cyme were slightly larger than later ones and that the 1st heads of flowers were usually the larger. Very little correlation was found between number of lobes and length of leaf.—*J. L. Collins.*

6356. REESE, H. H. *Horse-breeding suggestions for farmers.* U. S. Dept. Agric. Farmers' Bull. 803. 20 p., 10 fig. 1923.

6357. ROEMER. *Die Züchtung der Lupinen.* [The breeding of lupines.] Mitteil. Deutsch. Landw. Ges. 38: 134. 1923.—In this brief report of an address before a section of

the German Agricultural Society, it is reported that the blue lupine (*L. angustifolius* ?) is self-fertile while the yellow (*L. luteus*) is self-sterile. Plants from early seeding remain shorter stemmed and bloom and ripen earlier than those from later seeding. The rough hairy lupine (*L. hirsutus* ?) is low in alkaloid. Attempts to combine valuable qualities of different species by crossing have failed. Improvement must be by selection of variations.—*A. J. Pieters.*

6358. SEELHORST, VON. *Die am landwirtschaftlichen Institut der Universität Göttingen bislang geleistete Arbeit zur Förderung und Pflege landwirtschaftlicher Pflanzenzucht.* [On the work thus far accomplished by the Agricultural Institute of the University of Göttingen for promotion and fostering of agricultural plant breeding.] Beitr. Pflanzenzucht 5: 9-26. 14 fig. 1922. (Discussion p. 26-29.)—This general discussion of the work at this institute states some of the more important accomplishments. The 1st director, Drechsler, began breeding Göttinger rye in 1879, Göttinger oats in 1880, and the bearded Square head wheat in 1885. Cultural and breeding methods are described, the latter consisting at first of head or panicle selection year after year in the same line, and later of pedigree breeding from new selections in the original lines. Publications of investigations in plant physiology at the institute are listed and some of the results of more general interest are briefly outlined.—*C. E. Leighty.*

6359. SIEMENS. [German rev. of: MEIROWSKY und BRUCK. *Über die Vererbung und Ätiologie der Muttermäler.* (On the heredity and etiology of birth marks and moles.) Münchner Med. Wochenschr. 68: 1048. 1921.] Arch. Rass.- u. Ges. Biol. 14: 449. 1923.

6360. SIEMENS. [German rev. of: SIEMENS. *Über rezessiv-geschlechtsgebundene Vererbung bei Hautkrankheiten.* (Recessive sex-linked inheritance in the skin diseases.) Arch. Dermatol. 136: 69-88. 1921.] Arch. Rass.- u. Ges. Biol. 14: 442-443. 1923.

6361. SIEMENS. [German rev. of: WEINBERG. *Das Geschlechtsverhältnis bei Basedow und seine Ursachen.* (The sex ratio in Basedow and its origin.) Münchner Med. Wochenschr. 68: 1157. 1921.] Arch. Rass.- u. Ges. Biol. 14: 449. 1923.

6362. SIEMENS. [German rev. of: WEINBERG. *Zur Lehre vom multiplen Allelomorphismus.* (Our knowledge of multiple allelomorphism.) Münchner Med. Wochenschr. 68: 950. 1921.] Arch. Rass.- u. Ges. Biol. 14: 448-449. 1923.

6363. SUMNER, F. B. *Some facts relevant to a discussion of the origin and inheritance of specific characters.* Amer. Nat. 57: 238-254. 1923.—Characters separating subspecies (of *Peromyscus*) are genetical [see Bot. Absts. 12, Entry 2452]. Correlations are to be found between climatic environment and certain physical characters, notably between humidity and pigmentation. Increased humidity may favor chemical processes responsible for pigmentation, or modified pigmentation may be induced by environment acting selectively. No certain correlations are evident between physical environment and proportional or absolute size of parts. Any such relationship existing must be obscure and not evidently adaptive. Excluding direct environmental influences and adaptive modifications, sub-specific modifications might be due to (1) differential distribution centers or (2) the result of "orthogenesis." If the orthogenetic hypothesis is invoked, it is necessary to explain many of the variational series in terms of space rather than of time. But either of these explanations, highly speculative as they are, suffices only to account for presence of graded series and not character origins. An orthogenetic explanation involves radical departure from the commonly understood mutation theory.—A positive correlation of about 0.3 is found between shade of pelage and width of tail stripe but no other intra-individual correlation has been found. In hybridization between subspecies of *Peromyscus*, both F_1 and F_2 individuals showed intermediate values for the various subspecific characters. Neither the character complex nor components of the same acted as "simple Mendelian unit characters." Certain conditions render doubtful a tenable explanation on the basis of multiple factors. Finally, the facts do not yet warrant an adequate general hypothesis as to species formation.—*L. R. Waldron.*

6364. TREDGOLD, A. F. **Educability and inheritance.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 361-372. Williams & Wilkins Co.: Baltimore, 1923.—The capacity for mental development varies with individuals, social classes, and races, and is determined by innate germinal potentialities which cannot be exceeded. Such differences can be correlated to some extent with brain structure and function. In mental deficiency there is a numerical shortage of cells, an irregularity in their arrangement, and an imperfection of their development; certain layers of cortical fibers which are associative in function undergo a gradual increase with normal mental development. A diminution of educability is probably due to 1 of 2 causes; to a lack of intellectual stimulus continued for many generations past or to a pathological condition due to an impairment of germinal potentiality by disease, alcoholism, etc. Such defective educability due to germinal impairment is probably unimprovable and is transmissible. There is evidence for the belief that the continued stimulus of education and exercise of the mind generation after generation may augment the germ potentially for mental development and so increase the educability of the race.—*Charlotte Elliott.*

6365. WITTE, HERNFRID. **A probable case of "rogue" in red clover.** *Hereditas* 4: 55-58. 1923.—Two red clover plants of a type thought to be practically self-fertile were crossed. Of 3 individuals raised as a result of this cross 1 was peculiar in having very narrow leaflets, the width being to the length as 1:7.6 or 1:8 as compared with the ordinary type, in which this ratio is 1:1 or 1:3. The plant proved to be sterile, and Witte suggests that this is a "rogue" in the same sense of Bateson and Pellew.—*A. J. Pieters.*

6366. WOLLNY. [German rev. of: MEGGENDORFER, F. *Über die Rolle der Erbllichkeit bei der Paralyse.* (On the role of heredity in paralysis.) *Zeitschr. Ges. Neurologie u. Psychiatrie* 65: 18-33. 1921.] *Arch. Rass.- u. Ges. Biol.* 14: 461. 1923.

6367. WOODS, FREDERICK A. **The conification of social groups. Evidence from New England families.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 312-328. Williams & Wilkins Co.: Baltimore. 1923.—Social groups sometimes tend to assume the form of a cone; that is, figuratively, some of the group climb upward on the shoulders of others. The development of an aristocracy depends upon the following facts: (1) like tends to mate with like; (2) like begets like. These two forces acting simultaneously lead toward diversification in a population.—The British Dictionary of National Biography shows that the percentage of eminent men coming from the families of craftsmen, artisans, and unskilled laborers has decreased from 11.7 per cent for all time prior to the 19th century, to 4.2 per cent for the 2nd quarter of the 19th century. Thus the gap between the common people and the aristocracy of intellect is widening. In New England conification is actually observed. The great majority of early settlers in Massachusetts Bay were yeomen (artisans, small shopkeepers, etc.), with a sprinkling of gentry (members of gentle English families, the wealthy, learned, etc.). Forty colonial families including more than 3,000 persons have been studied. Differences in wealth and amount of intermarriage between classes were chosen as measures of the extent of conification. Rich men of New England have become progressively richer, by comparison with average men, since the colonial period. The percentage of marriages of the gentry with yeomanry has decreased from about 23 per cent (13 families, marriages prior to 1721), to less than 6 per cent (12 families, marriages since 1821). Assortive mating, heredity, and the possibility of transmitting wealth have thus resulted in social conification within a democracy.—*H. R. Hunt.*

6368. WOODWORTH, C. M. **Calculation of linkage intensities where duplicate factors are concerned.** *Genetics* 8: 106-115. 1923.—This paper concerns the development and application of formulae by means of which from F_2 trihybrid distributions, the degree of linkage can be determined between 2 factors 1 of which is a duplicate, but inherited independently of the 3rd factor involved in the cross.—Application is made to soybean data showing a linkage relation between cotyledon and seed-coat colors. Tables are included giving

theoretical distributions for several assumed gametic series, representing both coupling and repulsion phases, for F_2 in both characters, and also for F_2 in seed-coat color with F_2 in cotyledon color.—*C. M. Woodworth.*

HORTICULTURE

J. H. GOURLEY, *Editor*

JOHN BUSHNELL, *Assistant Editor*

(See also in this issue Entries 6169, 6191, 6192, 6197, 6200, 6209, 6213, 6313, 6317, 6535, 6572, 6576, 6577, 6578, 6584, 6589, 6597, 6601, 6626, 6638, 6653, 6666, 6689, 6690, 6694)

FRUITS AND GENERAL HORTICULTURE

6369. ANONYMOUS. The testing of varieties of hardy fruit for commercial purposes. Jour. Roy. Hort. Soc. 48: 65-67. 1923.—The arrangement between the Royal Horticultural Society and the Ministry of Agriculture for the testing of hardy varieties of fruits including apples, pears, plums, cherries, currants, gooseberries, raspberries, blackberries, strawberries, and nuts is explained.—*J. S. Bailey.*

6370. ARRANGER, CH. L'emballage des fruits de choix. [Packing choice fruits.] Rev. Hort. 94: 252-254. Fig. 79-81. 1922.

6371. AUCHINLECK, G. G. The cultivation of limes. Dept. Agric. Ceylon Bull. 49. 18 p., 2 pl. 1921.—This is a general consideration of the subject especially in reference to the commercial aspects of the crop in Ceylon.—*E. D. Merrill.*

6372. AUCHINLECK, G. G. The west African oil palm and its products. Dept. Agric. Ceylon Bull. 62. 18 p., 5 pl. 1923.—This is a general consideration of the oil palm (*Elaeis guineensis*) in reference to its agricultural and commercial aspects. It seems likely that the production and utilization of palm oil and kernel oil will in the future become as highly specialized as rubber or as coconut oil.—*E. D. Merrill.*

6373. BRYCE, G., AND C. H. GADD. Improvement of yield in Hevea by the selection of seed bearers. Dept. Agric. Ceylon Bull. 55. 42 p., 9 fig. 1922.—The offspring of a high-yielding mother tree are not all high yielders, but their mean yield is slightly higher than that of trees grown from non-selected seed, thus indicating that the production of a high-yielding strain of *Hevea* would necessitate rigid selection over several generations.—*E. D. Merrill.*

6374. CHASSET, L. Les effets du surgreffage. [The effects of top grafting.] Rev. Hort. 94: 242. 1922.—Varieties not readily grafted on quince may be made to succeed by double working. Time of maturity or shape of the fruit of the scion probably have no direct relation to these characteristics of the stock.—*E. J. Kraus.*

6375. CHASSET, L. Pincement et non pincement des arbres fruitiers. [Pinching or non-pinching of fruit trees.] Rev. Hort. 94: 197-198. 1922.—The author states that pinching may be omitted except where necessary to aid in forming the tree, or when the fruit is too densely surrounded by leaves.—*E. J. Kraus.*

6376. CHASSET, L. Poire Duchesse Bererd. [The D. Bererd pear.] Rev. Hort. 94: 256-257. 1 pl. (col.). 1922.—Origin and descriptive notes are given.—*E. J. Kraus.*

6377. CREVOST, C., ET C. LEMARIÉ. Catalogue des produits de l'Indochine. Groupe III. Matières grasses-oléagineux. [Catalogue of the products of Indo-China. Fats and oils.] Bull. Econ. Indochine 25: 143-158, 325-343, 387-430. Illus. 1922.—A general consideration of the native and introduced oil-producing plants in Indo-China. The more important species are illustrated.—*E. D. Merrill.*

6378. DERN. Auswahl und Beschaffung von brauchbaren Amerikanerreben zu Unterlagshölzern. [Selection and production of useful American vines for stocks.] Mitteil. Deutsch. Landw. Ges. 38: 274-275. 1923.—The author points out that while the German vine-growing sections are still comparatively free from Phylloxera the difficulty of keeping them so is becoming increasingly great. The good and bad points of some of the more common American stocks at present used in France are brought out.—*A. J. Pieters.*

6379. HOOKER, H. D., JR. Localization of factors determining fruit bud formation. Missouri Agric. Exp. Sta. Res. Bull. 47. 19 p. 1921.—A statistical study of fruit spurs of apple showed an increased tendency toward fruit-bud formation with increased length of spur. More fruit buds were formed on spurs which had grown 3-10 cm. in the previous year than on those which had grown 1-3 cm. Further analysis of data showed a pronounced tendency toward mass action, as far as fruit-bud formation is concerned, by individual trees, scaffold limbs, and branches. From this it would appear that the relation between fruit-bud formation and length of spur is a parallel manifestation of the same influence rather than a cause and effect relationship. This idea is strengthened by data showing that spurs which never blossom alternate in length growth as do blossoming spurs. Chemical analyses of spurs and bark on bearing and non-bearing trees showed increased carbohydrates in the non-bearing trees in both cases. Apparently the conditions in the bearing spurs influence the composition of remote parts of the limb, and the non-bearing spurs. Whether or not remote parts influence the spurs is not yet known. The author concludes that, while the individual spurs may act as units, they may at times be influenced by the performance of other spurs.—*A. M. Burroughs.*

6380. LESOURD, F. Pincement ou non pincement des arbres. [Pinching or non-pinching of trees.] Rev. Hort. 94: 260. 1922.—Some evidence is presented for and against the practice. Detailed experimental work is suggested.—*E. J. Kraus.*

6381. MACOUN, W. T. Recent developments in plant breeding. Canadian Hort. 46: 141-160. 1923.—The author points out that the need for better varieties to take the place of the fruits and vegetables already on the market and for more beautiful varieties among ornamental plants has become more and more impressed upon horticultural workers.—Some of the difficulties in plant breeding are noted particularly with reference to pollen germination. In transmission of characters valuable information is accumulating, as for example the ability of the McIntosh apple to transmit its characters to its seedlings.—*E. F. Palmer.*

6382. MUNN, M. T. Testing lawn grass seed mixtures. Seed World 12: 21. 1922.—The author states that seedsmen should exercise greater care in preparing lawn grass seed mixtures. Many mixtures contain excessive amounts of inert matter and are foul with weed seeds of many kinds. They are also weighted with the heavy grass seeds. Wide variations in results may occur when testing these mixtures.—*M. T. Munn.*

6383. NOMBLOT-BRUNEAU. Bigarreau Gustav Dupau. [The cherry, Gustav Dupau.] Rev. Hort. 94: 56. 1 pl. (col.). 1922.—The tree, distributed in 1922, is productive, hardy, and vigorous. The fruit has yellow, firm flesh, of very good quality.—*E. J. Kraus.*

6384. PALMER, E. F. The pollination of fruits. Canadian Hort. 44: 173-188. 1921.—A brief discussion is given of self-sterility and self-fertility of various deciduous tree fruits and grapes, together with the results of investigations in grape pollination.—*E. F. Palmer.*

6385. PETIT, A. L'ensachage des fruits influe-t-il sur la durée de leur conservation. [Does the bagging of fruits influence the length of time they may be kept?] Rev. Hort. 94: 76. 1922.—Neither the time, nor the conditions of keeping of apples, at least, is influenced by bagging.—*E. J. Kraus.*

6386. PETIT, A. Résistance des sarments à la dessiccation. [Resistance of grape shoots to drying.] Rev. Hort. 94: 61. 1922.—Shoots subjected to marked drying out should be

placed in water several hours before being used in propagation. Buds on such soaked shoots start several days in advance of those not so treated. Shoots dessicated for 31 days had 36.9 per cent moisture as compared with 48.5 per cent in those freshly cut. Buds from such dried shoots were delayed 8 days in starting.—*E. J. Kraus.*

6387. SHOEMAKER, J. S. Cause of lime-sulphur injury. *Canadian Hort.* 46: 117-140. 1923.

6388. SHULL, C. A. *Fundamentals of fruit production.* [Rev. of: GARDNER, V. R., F. C. BRADFORD, AND H. D. HOOKER, JR. *The fundamentals of fruit production.* xvi + 686 p. McGraw-Hill Book Co.: New York, 1922 (see Bot. Absts. 12, Entry 452).] *Bot. Gaz.* 75: 103. 1923.—The reviewer commends the large number of literature citations presented, amounting to nearly 1000. He further commends the attention the authors have given to the rôle of fundamental science in the realm of horticulture and states that "if its publication leads to the requirement of larger training for students of horticulture in fundamental physics, chemistry and physiology, a great service to horticultural science has been rendered."—*B. W. Wells.*

6389. STOCKDALE, F. A. *The cultivation of pineapples in Ceylon.* Dept. Agric. Ceylon Bull. 50. 12 p., 4 pl. 1921.—The subject is considered generally and from an agricultural and commercial standpoint in reference to Ceylon conditions.—*E. D. Merrill.*

6390. VIDAULT, A. *La multiplication d l'oranger.* [The propagation of the orange.] *Rev. Hort.* 94: 76-77. 1922.

6391. WICKSON, E. J. *California fruits and how to grow them.* 9th rev. ed., 508 p., 15 pl., 93 fig. Rural Pacific Press: San Francisco, 1921.—This is a manual of methods used in the production of fruits under California conditions. The following chapter headings indicate the nature of the contents. Part I: 6 chapters dealing with climate, soils, wild fruits, Mission fruits, and the place of California in the fruit industry of America. Part II treats of the culture of fruits in 9 chapters: clearing the land; the nursery, budding and grafting; preparation of soil and trees for planting; pruning and thinning of trees and fruit; tillage; fertilizers; and irrigation. Part III: 9 chapters on the fruits themselves,—apple, apricot, cherry, peach, nectarine, pear, plum, prune, and quince. Part IV: 4 chapters on the grape,—the industry, propagating and planting, pruning and care, and varieties. Part V: 8 chapters on semi-tropical fruits,—the avocado, date, fig, olive, orange, pomelo or grape fruit, lemon, and minor ones. Part VI: 1 chapter, on berries and currants. Part VII: 3 chapters on nuts,—the almond, walnut, and minor ones. Part VIII: a chapter on fruit preservation,—canning, crystallizing, and drying. Part IX: 4 chapters on fruit protection,—injuriously insects, diseases, suppression of injurious animals and birds, and wind and frost. Part X: a chapter on utilization of fruit wastes; and a topical index.—*Guy L. Philp.*

6392. ZIEGLER. Über die züchterische Verbesserung des weissen Burgunders im Jahre 1922. [On the improvement by breeding of white Burgundy (grape) in 1922.] *Mittel. Deutsch. Landw. Ges.* 38: 355-357. 1923.—This progress report gives an account of selection and breeding work being done with this variety at various stations in Germany.—*A. J. Pieters.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

6393. ANONYMOUS. *Antirrhinum* under glass. *Jour. Roy. Hort. Soc.* 48: 92-97. 1923.—A test was made of growing *Antirrhinum* in pots under glass. A classified description of varieties showing awards and notes is given.—*J. S. Bailey.*

6394. ANONYMOUS. *Dahlias* at Wisley, 1922. *Jour. Roy. Hort. Soc.* 48: 98-105. 1923.—A trial was made of 16 classes of Dahlias including over 80 varieties. This included those receiving awards the previous year and new varieties not previously tested. A classified list showing awards made and giving descriptions of new varieties is given.—*J. S. Bailey.*

6395. ANONYMOUS. **New or noteworthy plants in the Society's gardens, III.** Jour. Roy. Hort. Soc. 48: 60-64. Fig. 22-23. 1923.—The introduction, culture, and value of *Primula Winteri*, *Primula Juliae*, *Lonicera thibetica*, and *Rhododendron hemitrichotum* are discussed.—*J. K. Shaw*.

6396. ANONYMOUS. **Notes on Rhododendrons.** Rhododendron Soc. Notes 2: 107-109, 112-142. 1922.—Notes under varying titles by 16 members of the Rhododendron Society are given on the flowering, ornamental merits, hardiness, behavior, etc., of Rhododendrons in different places in the British Isles.—*Alfred Rehder*.

6397. ANONYMOUS. **Summer flowering stocks at Wisley, 1922.** Jour. Roy. Hort. Soc. 48: 113-120. 1923.—Stocks (150 varieties) were set out for trial. The awards of the judges, classified descriptions, and notes are given.—*J. S. Bailey*.

6398. ANONYMOUS. **Sweet peas at Wisley, 1922.** Jour. Roy. Hort. Soc. 48: 106-112. 1923.—Stocks (160) of Spencer sweet peas, including only those of pale pink shades, were tested. A classified list is given showing the awards made and including brief descriptions.—*J. K. Shaw*.

6399. ANONYMOUS. **Violas at Wisley, 1922.** Jour. Roy. Hort. Soc. 48: 121-133. 1923.—Stocks (221) of Violas were set out for trial and judged as to their bedding or exhibition value. The awards of the judges, classified descriptions, and notes are given.—*J. S. Bailey*.

6400. BOSCAWEN, A. T. **Some New Zealand trees and shrubs in Cornish gardens.** Jour. Roy. Hort. Soc. 48: 1-8. Fig. 1-7. 1923.—Many species representing *Pittosporum*, *Metrosideros*, *Leptospermum*, *Olearia*, *Senecio*, *Myrtus*, *Fagus*, *Hoheria*, *Gaya*, *Corokia*, and others are discussed. Their qualities as ornamental plants are considered, cultural directions given, and opinions of their value in England expressed.—*J. K. Shaw*.

6401. CHITTENDEN, F. J. **The award of garden merit II.** Jour. Roy. Hort. Soc. 48: 58-59. Fig. 19-21. 1923.—This article discusses the culture, habit, and value as ornamental plants of *Stranvaesia undulata*, *Pyracantha Gibbsii*, and *Rubus biflorus quinqueflorus*.—*J. K. Shaw*.

6402. CORREYON, H. **Les Romneyas.** [The Romneyas.] Rev. Hort. 94: 209-210. Fig. 66. 1922.—*R. trichocalyx* is fully hardy at Geneva, blooming profusely there; *R. Coulteri* is less hardy. A hybrid between the species is intermediate in character, and very vigorous.—*E. J. Kraus*.

6403. COUTTS, J. **Lilies.** Jour. Roy. Hort. Soc. 48: 22-37. 1923.—Some of the practices of lily culture are discussed very briefly. Several methods of propagation are given, indicating the species to which they are suited. Certain species are better suited to pot or greenhouse culture than others. A number of species are listed with brief notes of origin, habit of growth, cultural requirements, etc. Attention is called to the very small number of hybrids found in this genus.—*J. S. Bailey*.

6404. DAVEAU, J. **A propos de la floraison du Phyllostachys aurea.** [Concerning the flowering of *P. aurea*.] Rev. Hort. 94: 215. Fig. 68. 1922.—The caryopsis of this bamboo is figured.—*E. J. Kraus*.

6405. DURYEA, MINGA POPE. **Gardens in and about town.** xvi + 183 p., 97 fig. E. P. Dutton & Co.: New York, 1923.—Foreword by RICHARDSON WRIGHT.—Fourteen chapters on: the heritage of the brownstone front; with its back to the street; the garden in a well; architecture and city gardens; the community garden; hanging gardens; gardens on the roof of the world; gardens on the edge of town; gardens in windows; screening the objectionable; furnishing the city garden; plants that will grow; care of city gardens; four seasons in town.—*C. S. Gager*.

6406. ELEY, CHARLES. Concerning stocks on which to graft *Rhododendrons*. *Rhododendron Soc. Notes* 2: 110-111. 1922.—The superiority of *Rhododendron caucasicum* hybrids over *R. ponticum* as stock for grafting is emphasized and attention is drawn to the use of *R. Smirnowii* as stock, which seems to be well adapted for that purpose.—*Alfred Rehder*.

6407. GÉRÔME, J. Au sujet du *Camellia*; sa multiplication. [Concerning the *Camellia*; its propagation.] *Rev. Hort.* 94: 193-194. *Fig. 62*. 1922.

6408. GÉRÔME, J. Au sujet du *Camellia*, son importance horticole, autrefois et maintenant. [Concerning the *Camellia*, its past and present horticultural importance.] *Rev. Hort.* 94: 172-174. 1922.

6409. GUILLAUMIN, A. Les monstruosites florales des Dahlias. [Monstrosities in *Dahlia* flowers.] *Rev. Hort.* 94: 259. *Fig. 83-84*. 1922.—At the center of the disc the axis is prolonged and another disc is formed more than 1 cm. above the lower one. The latter bears a single row of ligulate flowers at its margin; the 2nd disc bears both ligulate and tubular flowers. The effect is decorative; the variety should prove of horticultural value.—*E. J. Kraus*.

6410. HESSE, A. *Picea Breweriana* Wats. *Rev. Hort.* 94: 97. *Fig. 35*. 1922.

6411. LERAY, C. Le *Rhododendron calophytum* Franch. *Rev. Hort.* 94: 187-188. *Fig. 57-59*. 1922.

6412. LERAY, C. Un intéressant sapin pleureur: le *Picea Breweriana* Wats. [An interesting weeping spruce; *Picea Breweriana* Wats.] *Rev. Hort.* 94: 49-50. *Fig. 14*. 1922.—Distribution, description, and decorative value are discussed.—*E. J. Kraus*.

6413. LESOURD, T. L'Iris chez les anciens. [The iris among the old horticulturists.] *Rev. Hort.* 94: 98-100. *Fig. 36-37*. 1922.—Historical notes are given on early varieties and species.—*E. J. Kraus*.

6414. MAGNIER, C. *Polemonium Magnieri*. *Rev. Hort.* 94: 81. 1922.

6415. MOTTET, S. Deux nouvelles Clématites. [Two new Clematis.] *Rev. Hort.* 94: 213-215. *Fig. 67, 1 pl. (col.)*. 1922.—The forms are hybrids between *C. Spooneri* × *C. montana rubens*, and *C. Spooneri* × *C. vedrariensis*. The forms are very similar in both cases, resembling *C. Spooneri* except that the flowers are rose colored; hence the name *C. Spooneri rosea* has been applied.—*E. J. Kraus*.

6416. MOTTET, S. Ipomée a grande fleur bleue très hative. [Very early, large flowered, blue *Ipomoea*.] *Rev. Hort.* 94: 78-80. *1 pl. (col.), fig. 32*. 1922.

6417. MOTTET, S. Les iris a fleurs d'orchidée. [Orchid flowered irises.] *Rev. Hort.* 94: 236-237. *1 pl. (col.)*. 1922.—The possible value of several species as parents of new varieties is discussed. Descriptions are given of a number of varieties, more or less new.—*E. J. Kraus*.

6418. MOTTET, S. L'oeillet de Chine royal. [The royal strain of the Chinese pink.] *Rev. Hort.* 94: 102-103. *Fig. 33, 1 pl. (col.)*. 1922.

6419. MOTTET, S. *Lycoris aurea*. *Rev. Hort.* 94: 51-52. *Fig. 15*. 1922.

6420. PROSCHOWSKY, A. R. Floraison d'une variété de *Phyllostachys aurea*. [Blooming of a variety of *P. aurea*.] *Rev. Hort.* 94: 108. 1922.—Mainly because of differences in color from that of the type, the variety is named *P. aurea viridi glaucescens*.—*E. J. Kraus*.

6421. PROSCHOWSKY, A. R. *Ipomée a grande fleur bleue très hative*. [Very early, large flowered, blue *Ipomoea*.] *Rev. Hort.* 94: 78-80. 1922.

6422. PROSCHOWSKY, A. R. *Sasa paniculata* Makino et Shibata. *Rev. Hort.* 94: 134. 1922.

6423. RIVOIRE, A. *Quelques plantes grimpantes de serre*. [Some climbing greenhouse plants.] *Rev. Hort.* 94: 254-256. *Fig. 82*. 1922.—Brief descriptive and cultural notes are given on *Allamanda Hendersonii*, *Gloriosa Sanderiana*, *Abutilon vexillarium*. Species of *Swainsonia*, *Passiflora*, and *Dipladenia* are suggested.—*E. J. Kraus*.

6424. SLOOTEN, D. F. VAN. *Index Combretacearum quae anno 1921 in horto botanico bogoriensi coluntur*. [List of Combretaceae cultivated in 1921 in the Botanic Garden at Buitenzorg.] *Bull. Jard. Bot. Buitenzorg* III, 4: 281-282. 1922.

6425. SLOOTEN, D. F. VAN. *Index Verbenacearum quae anno 1921 in horto botanico bogoriensi coluntur*. [List of Verbenaceae cultivated in 1921 in the Botanic Garden at Buitenzorg.] *Bull. Jard. Buitenzorg* III, 4: 283-287. 1922.

6426. STERN, F. C. *Gardening on chalk*. *Jour. Roy. Hort. Soc.* 48: 9-15. *Fig. 8, 10*. 1923.—Experience in growing ornamental plants on chalk in a garden on the Sussex downs is given. The original vegetation consisted of sycamore trees, *Viburnum lantana*, blackberries, dogwood, wild clematis and apple and pear trees. It was found that if the hard rock chalk was broken up to a depth of 2-3 feet, all trees and shrubs that tolerate lime grew well. Azaleas, *Styrax*, and *Rhododendrons* with the exception of *R. rubiginosum* did not tolerate lime. The Japanese and North American floras as a general rule dislike lime. Observations of the behavior of many shrubs and some annual plants on various kinds of chalk soils are given.—*J. K. Shaw*.

6427. TESNIER, F. *La floraison des iris*. [The flowering of irises.] *Rev. Hort.* 94: 174. 1922.—A list is given of species and varieties, with period of flowering.—*E. J. Kraus*.

6428. THOMAS-JAVIT, G. *Observations sur la culture de l'Ipomoea rubro-caerulea*. [Observations on the culture of *I. rubro-caerulea*.] *Rev. Hort.* 94: 109. 1922.—The plant may be grown in the open as an annual if old seed, the coats of which have been broken before soaking, are planted in April and the plants transferred to open ground in May.—*E. J. Kraus*.

6429. WALLER, L. D. *Flower seed industry in California*. *Seed World* 10²: 15-18. 1921.

6430. WICKSON, E. J. *California garden flowers, shrubs, trees and vines*. 2nd ed., rev. 255 p., 15 pl., 12 fig. Pacific Rural Press: San Francisco, 1923.—This text of 6 parts and 28 chapters is designed primarily for the working amateur giving suggestions of California conditions, cultural treatments, and adaptations of flowers; also, the selection of shrubs, trees, vines, and protection against plant pests.—*Guy L. Philp*.

6431. WRIGHT, RICHARDSON. *Flowers for cutting and decoration*. xi + 218 p., 20 fig. E. P. Dutton & Co.: New York, 1923.—The book consists of the following 12 chapters: five garden perplexities; the nursery and the cutting garden; annuals and biennials for cutting; cut flowers from tubers and bulbs; perennials for cutting; some of the flowering shrubs; roses indoors and out; cutting and arranging flowers; bouquets for spring, summer, and autumn; winter bouquets from summer flowers; the garden still room; after frost.—*C. S. Gager*.

VEGETABLE CULTURE

6432. ANONYMOUS. **Beet at Wisley, 1922.** Jour. Roy. Hort. Soc. 48: 68-73. 1923.—The awards, notes, and descriptions based on the tests of 107 stocks of beets are given. Special attention is called to regaining of purity of seed since the war and to the value of round varieties as vegetables.—*J. S. Bailey.*

6433. ANONYMOUS. **Broad beans at Wisley, 1922.** Jour. Roy. Hort. Soc. 48: 74-78. 1923.—The results of the test of 83 stocks of broad beans are given. Awards are announced and a classified list of varieties is presented.—*J. S. Bailey.*

6434. ANONYMOUS. **Celeriac at Wisley, 1921-22.** Jour. Roy. Hort. Soc. 48: 84-85. 1923.—Thirteen stocks of celeriac were set out for trial. The awards, description, and notes of the judging committee are given.—*J. S. Bailey.*

6435. ANONYMOUS. **Celery at Wisley, 1921-22.** Jour. Roy. Hort. Soc. 48: 79-83. 1923.—Sixty stocks of celery were placed under trial. A list of awards, descriptions, and notes by the fruit and vegetable committee is given.—*J. S. Bailey.*

6436. ANONYMOUS. **Late peas at Wisley, 1922.** Jour. Roy. Hort. Soc. 48: 86-91. 1923.—Stocks of peas (143) were tested. The qualities considered by the judges are enumerated, and awards, classified descriptions, and notes are given.—*J. S. Bailey.*

6437. BARR, J. E. **Summary of vegetable seed situation.** Seed World 13⁷: 13-14. 1923.

6438. BUISSON, J. M. **Le melon Kroumir Parisien.** [The melon Kroumir Parisien.] Rev. Hort. 94: 126-127. 1 pl. (col.) 1922.—The author states that this melon is better, thicker fleshed, and usable through a longer season than the cantaloupe.—*E. J. Kraus.*

6439. GUELF, C. P. **Thousands of acres of radishes grown in Michigan for seed.** Seed World 12¹²: 34-35. 1922.

6440. LOIZEAU, A. **La tomate pour l'exportation.** [The tomato for export.] Rev. Hort. 94: 73-75. Fig. 26-30. 1922.

6441. MORSE, L. L. **Growing lettuce seed in Santa Clara Valley.** Seed World 12⁶: 13-14. 1922.

6442. MORSE, L. L. **Growing onion bulbs in California.** Seed World 13⁹: 20-21. 1923.

6443. MORSE, L. L. **Growing onion seed in California.** Seed World 13⁶: 13-14. 1922.

6444. MUNN, M. T. **Practical value of germination tests and some factors affecting the test.** Seed World 11⁴: 23. 1922.—The author states that the seed analyst should strive to make germination tests of truck-crop seeds in such manner and under such conditions as will give the grower information of the greatest practical value.—*M. T. Munn.*

6445. REICHELT. **Sortenanbauversuche mit Frühkarotten.** [Variety tests of early carrots.] Mitteil. Deutsch. Landw. Ges. 38: 141-143. 1923.—A report is made on 2 varieties, "Pariser Markt" and "Duwiker," at 6 stations. The latter gave the largest yields at all stations.—*A. J. Pieters.*

6446. SÖRENSEN, S. **Garden seed industry in Denmark.** Seed World 13⁵: 18-19. 1923.—Seed activities in Denmark are described.—*M. T. Munn.*

6447. THURLIMANN, LEOTA. **Commercial garden seed laboratory problems.** Seed World 12⁵: 13-14. 1922.—Many problems arise in the germination testing of garden seeds which

should be solved by careful research. The important problems discussed are: dormancy in germination; germination versus viability; cause of abnormal sprouts; moldiness in testing; carry-over stock; and need of experimental work. The difficulties encountered in testing flower seeds is discussed.—*M. T. Munn.*

6448. VAUGHAN, L. H. Safeguards in the garden seed business. *Seed World* 12¹: 34. 1922.

6449. WHITE, K. S. Some objections to governmental control of garden seed sales. *Proc. Assoc. Official Seed Analysts North America* 1919: 28-30. 1921.—The author expresses the belief that state control of garden seed sales is not worth what it costs with the possible exception that packages be dated as to the year of output.—*M. T. Munn.*

6450. WICKSON, E. J. *The California vegetables in garden and field. 5th rev. ed., 319 p., 23 pl., 6 fig.* Pacific Rural Press: San Francisco, 1923.—This book of 39 chapters thoroughly covers the field of vegetable growing under California conditions, including a discussion of soils, irrigation, fertilizers, drainage, garden location and arrangement, propagation and planting, together with a treatment of the several crops grown.—*Guy L. Philp.*

HORTICULTURAL PRODUCTS

6451. CRUESS, W. V., and J. H. IRISH. Fruit beverage investigations. *California Agric. Exp. Sta. Bull.* 359. 526-567. 1923.—Most of the so-called fruit beverages now on the market contain little or no fruit juice. Excellent syrups and carbonated beverages may be made from loganberries, raspberries, oranges, lemons, and apples, and from blends of strawberries with blackberries, of Muscat with red wine grapes, of raisins with oranges and lemons, and of loganberries, red grapes or pomegranates with oranges and lemons. Sugar was used in the preparation of all syrups except those made from grapes and apples. Concentration by freezing and in a glass lined vacuum pan were both satisfactory methods of concentrating grape, apple, and citrus fruit juices. Syrups were preserved satisfactorily by pasteurizing in glass at 175°F. for 30 minutes, or by storage at 0-15°F. in sealed containers, without pasteurization. Glass containers were better than enamel-lined tin containers for pasteurized syrups. Preservatives imparted a disagreeable flavor and their use is not recommended. The syrups were found excellent for the preparation of carbonated bottled beverages, for soda fountain use, the preparation of centers for candies, and for home use in the preparation of punch, gelatin desserts, sauces, jellies, etc. Loganberry, grape, strawberry-blackberry blend, apple, raspberry, and fruit punch bottled carbonated beverages have retained their flavor and color satisfactorily for 6-15 months. Orange, lemon, and strawberry deteriorated markedly in quality after 2 months' storage. Pasteurizing at 150°F. for 30 minutes destroyed yeasts and prevented spoiling of carbonated fruit beverages heavily inoculated with yeast, mold, and bacteria. Heat-resistant molds and bacteria were not killed by this treatment, but the carbon dioxide prevented their development. As a result of the investigations the writers are convinced that carbonated fruit beverages can be made and sold at retail for 10 cents a bottle with a profit to all concerned. A large proportion of the surplus and cull fruits of California might be utilized to advantage in the preparation of fruit syrups and carbonated beverages.—*A. R. C. Haas.*

6452. IRISH, J. H. Pear by-products. *California Agric. Exp. Sta. Circ.* 259. 4 p. 1923.—The purpose of the investigations here reported is to discover new outlets for cull pears in the form of by-products. Methods and preparation are given for the utilization of cull pears as spread, vinegar, candy, and syrup.—*A. R. C. Haas.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 6212, 6230, 6231, 6245, 6295, 6404, 6409, 6514, 6607, 6650, 6654, 6689, 6693, 6694, 6705)

6453. ARBER, AGNES. On the 'Squamulae intravaginales' of the Helobieae. *Ann. Botany* 37: 31-42. 5 fig. 1923.—Squamulae intravaginales are very small scale-like structures found among the leaf-bases of the Helobieae and certain Araceae. A study of serial sections of the stem apex of several species shows that they are appendages not of the leaf, in the axil of which they occur, but of the surface of the internode which separates this leaf from the one next above. In terms of the "leaf-skin" theory of Saunders, which the author favors, they are to be regarded as dorsal outgrowths from a downward skin-like prolongation of the leaf next above and are therefore not related to stipules or ligules as has been suggested.—W. P. Thompson.

6454. BOWER, F. O. Size, a neglected factor in stelar morphology. *Proc. Roy. Soc. Edinburgh* 41: 1-25. Fig. 1-19. 1920.—This article presents an application of the principle of similar structures, enunciated by Galileo, to the vascular system of plants. Other things being equal, the rate of interchange of substances in solution is proportional to the tissue-surface involved. For each form of structure there is a size limit beyond which sufficient rapidity of interchange will be impossible without modification in form or quality of the tissue-surface through which diffusion must occur. This applies to internal limiting surfaces as well as external. The endodermis forms both a structural and a physiological barrier between the stele and the surrounding tissues, regulating by its own protoplasts all exchange of soluble substances. As the sporeling develops into the adult fern there is reached a limit in size of the stem beyond which the conically enlarging stele cannot supply the surrounding tissues, unless there is deviation on the part of the endodermal surface from the simple conical form. The protostele, the most primitive stelar condition, is found in all juvenile forms and is retained in the adult stem of some ferns. When larger dimensions of the stele were attained the problem of the limiting endodermis was solved by: (1) corrugation and involution of its surface as in the fossil forms *Ankyropteris Grayi*, *Asterochlaena laxa*; (2) the interruption of the endodermal barrier and the development of meristemes as in *Osmundites skidegatenensis* and *O. Carnieri*; (3) in the *Leptosporangiateae*, a transformation of the protostele, giving rise to the solenostelic, dictyostelic, and eventually the polystelic condition. These modifications all result in an increase in endodermal surface in proportion to bulk of stelar tissue and are accompanied by a great increase in transverse section of the stele. They may be traced in both ontogeny and phylogeny and perhaps account for the great success of the *Leptosporangiate* type. That size is not always the determining factor is shown by *Pandanus* in which there is no stelar disintegration, even in roots 5 cm. in diameter. The dicotyledons and gymnosperms have solved their problem by development of a cambium and the resulting secondary increase together with medullation.—Ray C. Friesner.

6455. COLE, J. W. Teratological phenomena in the inflorescences of *Fagus sylvatica*. *Ann. Botany* 37: 147-150. 2 fig. 1923.—Abnormal female inflorescences were frequently observed showing hermaphrodite and male flowers on the cupules. There was a graded series from the normal female flowers through forms with more or less rudimentary inferior ovary and reduced androecium to typical male flowers with or without a vestigial superior ovary. The higher the insertion of the flower on the segment of the cupule the nearer it approached the normal male structure. Abnormal examples were also found in which the structure of the whole inflorescence was transitional to that of the male. Out of 355 female inflorescences gathered indiscriminately 17 per cent were abnormal in some way.—W. P. Thompson.

6456. CONNORS, C. H. Twin and triplet peaches. *Jour. Heredity* 14: 89-92. 3 fig. 1923.—Double fruits are not uncommon on the peach, but in certain seasons are more numerous

than in others. These originate usually from twin blossoms but may come from double or triple pistils. Varieties of the Crawford or Persian group are more likely to form multiple fruits. It is an hereditary tendency which is enhanced by environmental factors tending to cause doubleness in the blossom.—*Author's abstract.*

6457. COOK, O. F. Evolution of compound leaves in walnuts and hickories. Jour. Heredity 12: 77-88. 6 fig. 1923.—Instead of the customary division of the leaves into 3 elements, 2 primitive elements may be recognized, the foot and the blade. The foot is the part of the primitive sheathing leaf-base that surrounded the succeeding internode. The blade is the expanded leafy portion. A distinct pulvinus at the end of the petiole may indicate the point of union of the 2 elements. In the walnuts and hickories no stipules are supposed to be present, but they may be recognized in the bud-scales, and in rudimentary organs that correspond directly with the lower pinnae of the compound leaf. Occasionally 1 or more pairs of pinnae other than the lower pinnae are replaced by stipule-like organs, and the leaf may be regarded as being made up of a number of these reduplicated stipules, only the terminal pinna representing the blade-element. Such reversions, and the combination of existing characters, are called metaphasic variations or "internal hybrids." This form of variation has particular evolutionary interest, as by it an organism continually tries out various combinations of characters that it already possesses.—*R. C. Cook.*

6458. CZAJA, A. TH. Studien zur Apogamie leptosporangiaten Farne. I. Über die Apogamie der *Pellaea atropurpurea* (L.) Link. und das Auftreten von Tracheiden im Prothallium. [Studies on apogamy in leptosporangiate ferns. I. On apogamy in *Pellaea atropurpurea* and the occurrence of tracheids in the prothallium.] Ber. Deutsch. Bot. Ges. 40: 346-352. 1922.—In diffuse daylight 3 types of prothallia develop: (1) weakly developed males; (2) larger females with prosenchymatic tissue and tracheids in the central region, and a well defined meristem from which apogamous outgrowths develop; (3) very short sterile prothallia with only parenchymatous cells in the central region, a limited meristematic activity, and some apogamous outgrowths. Besides a few small males, only prothallia of type (3) are developed under blue glass, and only type (2) under red glass. Because tracheids appeared in prothallia having arrested apogamous growths, De Bary and Goebel regarded the tracheids as a result of the arresting influence, but this seems improbable in view of the fact that under red glass all the prothallia with tracheids showed good development on the part of the apogamous sporophytes. The presence of tracheids is more probably due to disturbances in the correlation between the differentiation of elements and the place at which the differentiation occurs. Such tracheids are precociously differentiated sporophytic elements.—*L. W. Sharp.*

6459. DEBBARMAN, P. M. A floral abnormality of the Indian water lily. Jour. Heredity 14: 96. 1 fig. 1923.—A flower of *Nymphaea rubra* was observed in which a supernumerary flower had issued from the axils of 1 of the petals, and several of the stamens had developed into leaflike structures. The causes of this abnormal condition are not known.—*R. C. Cook.*

6460. ГОБИ, Х. Я. [GOBI, CH. JA.] Генетическая классификация плодов семенных растений. [The genetical fruit classification of angiosperms.] Ann. Inst. d'Essais de Semences Jard. Principal Bot. Republique Russe 44: 1-30. 1921.—This classification is close to that of Warming (1880) but the genetical relations among the groups are illustrated. The classification is based primarily upon the difference between dehiscent and indehiscent fruit, the latter of which is believed to have originated from the former. The primitive form of dehiscent fruit is the capsule. From this have been derived the 3 chief types of indehiscent fruit, the nut, the berry, and the drupe. Different fruit types may be present in the same family. In the Oleaceae, for example, 4 are represented: *Olea* (drupe), *Syringa* (capsule), *Fraxinus* (samara), and *Ligustrum* (berry). The same thing is true for the Rubiaceae, Capparidaceae, and others. The author believes that the primitive capsular type has become transformed in 3 different directions during the course of evolution.—*V. Lashevsky.*

6461. GRAF, J. Beiträge zur Kenntnis der Gattung *Populus*. Ber. Deutsch. Bot. Ges. 39: 193-194. 1921.—[See Bot. Absts. 11, Entry 439.]-Paul C. Standley.

6462. LOSCH, HERMANN. Ascidienbildung an Staubfäden vergrünter Blüten von *Tropeolum majus*. [Formation of ascidia on stamens of greened flowers of *T. majus*.] Ber. Deutsch. Bot. Ges. 37: 369-372. 1919.

6463. MANN, ANNETTE G. Observations on the interruption of the endodermis in a secondarily thickened root of *Dracaena fruticosa* Koch. Proc. Roy. Soc. Edinburgh 41: 50-59. Fig. 1-11, photo. 1-2. 1921.—Roots of *Dracaena* have a well indurated endodermis and a process of cambial increase similar to that of the stem. Serial transverse sections, beginning $1\frac{1}{2}$ inches back of the root tip, showed a gradual formation of internal cambium from the pericycle, followed by a distortion and finally an interruption of the endodermis, and later a cessation of cambial activity and a linking up of the endodermal cells. At about $3\frac{3}{4}$ inches from the tip the endodermal ring is almost complete and external cambium begins to appear. This gradually spreads around the root. Near the region of the stem secondary structures are present both inside and outside the endodermis, which is now broken up into groups of cells. Once it is well established, the external cambium is more active than the internal.—Ray C. Friesner.

6464. SCHÜEPP, OTTO. Zur Theorie der Blattstellung. [On the theory of phyllotaxy.] Ber. Deutsch. Bot. Ges. 39: 249-257. 1921.

6465. STEVENS, O. A. Double sweet clover seeds. Seed World 13⁸: 30. 1923.—In biennial white sweet clover and yellow-blossomed sweet clover 2-seeded pods are quite frequent, the seed lying side by side. The adjacent sides of the 2 seed are distinctly flattened.—M. T. Munn.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 6241, 6487, 6507, 6514, 6595, 6647, 6657)

6466. BULLOCK-WEBSTER, G. R. Some Charophyte notes 1917. Irish Nat. 29: 55-58. 1920.—Records of distribution in Ireland, chiefly from Achill Island, are given.—W. E. Praeger.

6467. CROW, W. B. Dimorphococcus Fritschii, a new colonial protophyte from Ceylon. Ann. Botany 37: 141-146. 1 fig. 1923.—The new species was collected in fresh water in Ceylon. Its comparative morphology and relationships are discussed.—W. P. Thompson.

6468. CROW, W. B. The taxonomy and variation of the genus *Microcystis* in Ceylon. New Phytol. 22: 59-68. Pl. 1. 1923.—A key is given for the 17 species of *Microcystis* considered to be fully known. Of these, 8 are recorded from Ceylon, including 2 new species (*M. protocystis* and *M. pseudofilamentosa*). A new form (f. *elongata*) of var. *incerta* (Lemm.) Crow of *M. pulvereae* (Wood) Migula is also described. The species are shown to be connected by numerous transitional forms, the nature of which is described in the forms from Ceylon. The distinction between *Aphanocapsa* and *Microcystis* is an artificial one. *Coelosphaerium dubium* Grun. is related to the pseudovacuolate species of *Microcystis*. *Coelosphaeriopsis* Lemm. is not distinguished by a valid generic character.—I. F. Lewis.

6469. GRIFFITHS, B. MILLARD. Tetraedroides spetsbergensis gen. et sp. nov., a new alga from Spitzbergen. New Phytol. 22: 69-71. Pl. 2. 1923.—The thallus of this new green alga of uncertain affinities is composed of 2 uninucleate cells with thick outer walls and many chloroplasts each containing a pyrenoid.—I. F. Lewis.

6470. GRUBB, VIOLET M. Preliminary note on the reproduction of *Rhodymenia palmata*, Ag. Ann. Botany 37: 151-152. 2 fig. 1923.—The female fronds were discovered. The procarps are developed in groups in acropetal succession. Each one bears a long trichogyne with a distinct nucleus. Though no antheridial fronds were recognized, bodies resembling spermatia were found on the trichogynes.—W. P. Thompson.

6471. GRUBB, VIOLET M. The attachments of *Porphyra umbilicalis* (L.) J. Ag. Ann. Bot. 37: 131-140. 8 fig. 1923.—The plant is commonly attached to rocks by small discs from 0.5 to several mm. in diameter. A disc is made up of interwoven filaments, some long and slender, others short and stout, which grow out from individual cells of the thallus. Filaments in contact with the substratum become attached by suckers or swell up and divide to give cells which are attached by their gelatinous walls. An endless variety of forms is assumed. Many filaments also turn outward and often cut off cells which form a compact outer parenchymatous tissue. This may creep along the substratum and produce new fronds. The plants sometimes grow on breakwaters and then the filaments have the power to penetrate the wood to considerable depths. In two plants growing on *Fucus* it was found that the filaments had penetrated far into the living tissues and even into the living cells of the host.—W. P. Thompson.

6472. HALL, CHARLES A. Desmids of the Clyde area: new records. Glasgow Nat. 8: 122-127. 1920.—Forty-nine species and varieties of desmids, hitherto unreported for the area, are listed. This brings the total records for the area to 192 species and varieties.—Ray C. Friesner.

6473. HITCHCOCK, ROMYN. *Tolypella longicoma* in Cayuga Lake, New York. Bull. Torrey Bot. Club 5: 173-176. Pl. 8. 1923.—The occurrence of *Tolypella longicoma* A. Braun in Cayuga Lake is reported and the habit and structure are discussed.—P. A. Munz.

6474. JANET, CH. Sur l'ontogénèse du *Volvox aureus* Ehr. [The ontogeny of *Volvox aureus*.] Compt. Rend. Acad. Sci. Paris 176: 997-999. 1 fig. 1923.—The figure shows successive bipartitions as exhibited in the surface layer. The final stage is said to contain 1,024 cells. The cells have a tetradic arrangement during the entire development. Each facet of a cell is determined by the tension of the protoplasmic and plasmodesmial connections. At each bipartition new plasmodesma appear; certain preexisting plasmodesma are retained unchanged; and certain other preexisting plasmodesma are multiplied.—C. H. Farr.

6475. NAUMANN, E. Einige Gesichtspunkte betreffs der bildlichen Darstellung des Kammerplanktons. [Some aspects of the figurative representation of plankton.] Archiv. f. Hydrobiol. u. Planktonk. 12: 454-467. 5 fig. 1920.—Methods of graphically representing the plankton collected in the Kolkwitz chamber are given. Previous methods of representing this chamber plankton suffer from limitations. For larger organisms a low magnification of the whole chamber area of 1 square cm. may be used, but for smaller forms a higher magnification of only a part is better. For these 1 square mm. is adopted, and the projection of organisms from a column of the usual chamber height of 2.63 mm. made. When the organisms are more numerous a depth of 1 mm. may be used, and $\frac{1}{10}$ mm. when very numerous. For organisms which are so infrequent that they cannot be detected in 1 cmm. a determination may be made of the frequency in 1 cc.—Harold Kirby.

6476. OEHLER, RUD. Flagellaten- und Ciliatenzucht auf reinem Boden. [Flagellate and ciliate culture.] Arch. Protistenk. 40: 16-26. 1919.—Species of *Bodo* and *Prowazekia* were grown on pure strains of the bacteria *Coccus pyogenes flavus*, *Vibrio metschnikof*, *Bacterium timothea*, and *B. coli*, and also on *B. coli* killed by heating. Both the agar-plate and agar-tube methods were successful. The ciliates *Colpoda steinii* and *Colpidium colpoda* were also grown in culture by the same methods. Various sterile organic culture media, such as peptone, beef extract, and egg white, were found to be much less favorable than media containing bacteria.—R. P. Hall.

6477. PASCHER, A. Über die übereinstimmungen zwischen den Diatomeen, Heterokonten und Chrysomonaden. [The relation between the Diatoms, Heterokonts, and Chrysomonads.] Ber. Deutsch. Bot. Ges. 39: 236-248. 1922.—The Chrysomonads, Diatoms, and Heterokonts may be united into a basic group, the *Chrysophyceae*. They show similarity in wall structure, this having in representative forms at least in one phase of development a lamellate structure, as in *Hyalobryon*, *Rhabdoderma*, and *Tribonema*. The wall is also frequently in 2 halves, as in Chrysomonad cysts, most Diatoms, and *Ophiocytium*. Silicification may be present as in Chrysomonad cysts, *Mallomonas*, some Heterokontae (*Halosphaera*), and Diatoms. Flagellation is somewhat similar, 1 flagellum or 1 long and 1 very short one being present, but little is known regarding the flagellae on reported Diatom zoospores. The pigments show some differences, but the most divergent group, the Heterokontae, may be a side line early distinguished by a loss of brown color. The Heterokonts and Chrysomonads have in common leucosin as the assimilate, and all have oils and fats.—*Wm. Randolph Taylor*.

6478. SAMPAIO, JOAQUIM. Desmideáceas do Porto e arredores. [Desmids from Oporto and vicinity.] Brotéria Sér. Bot. 20: 26-48. Pl. 1. 1922.—This list contains 101 species in 17 genera, mostly with rather complete descriptions. Of them, 38 were previously unreported for the Portuguese flora and 51 unreported in the vicinity of Oporto. *Closterium varzinense*, *Cosmarium stagnale*, and *C. portuense* are proposed as new species; *Micrasterias denticulata* var. *lusitanica* and *Cosmarium subtumidum* var. *minor* as new varieties. The authority in all cases is Sampaio f.—*E. B. Chamberlain*.

6479. SAUVAGEAU, C. Sur l'état quiescent prolongé d'une Algae phéosporée éphémère. [On the quiescent stage prolonged in an ephemeral pheosporic alga.] Compt. Rend. Acad. Sci. Paris 176: 478-482. 1923.—Most attention is given to a study of *Mesogloia Griffithsiana*. This alga appears only for a short period; later it cannot be found. It was grown in culture in an attempt to find the other stages in the life history. These are carefully described. Brief reference is also made to other members of the Chordariaceae.—*C. H. Farr*.

6480. SCHULZ, P. *Fragilaria exigua* (W. Sm.) Lemm., ein Beitrag zum Variabilitätsvermögen der Bacillariaceen. [A contribution to the variability of the Bacillariaceae.] Arch. Hydrobiol. u. Planktonk. 12: 750-755. 16 fig. 1920.—A series of transitional forms between the cross-formed *Fragilaria construens* var. *genuina* Grun. and the tripolar *F. exigua* is described and illustrated. This is the 1st observed case of the origin of a tripolar from a cross form and suggests that *F. exigua* is only a variety of *F. construens*. Similarities are noted to the fossil *F. pacifica* var. *trigona* J. Brun and *F. parasitica* var. *trigona* Grun., showing the existence of tripolar variants in other species of *Fragilaria*.—*Harold Kirby*.

6481. SVEDELIUS, N. Einige Bemerkungen über Generationswechsel und Reduktionsteilung. [Some remarks on alternation of generations and the reduction division.] Ber. Deutsch. Bot. Ges. 39: 178-187. 1921.—The discovery of the life cycle of *Laminaria* renders untenable the theory of Bower and Wettstein in which the reduction of the gametophyte generation is considered an adaptation to a terrestrial habit, because the series *Dictyota-Laminaria-Fucus* shows a comparable series in aquatic plants. The discovery that the reduction division occurs at different points in the life history in 1 group (e.g. Florideae) shows that the point of occurrence of this phase is not necessarily a fundamental feature of such a group. Fertilization permits of but little variety in the sorting of chromosomes while the reverse is true of the reduction divisions, which fact is of importance in plant variability and evolution. As a hypothesis it is suggested that the establishment of a diploid sporophyte through the postponing of the reduction divisions gives the plant the chance to effect many reduction divisions and so many more fundamental combinations of chromosomes. The diploid plant can produce the greater effect with the least material output provided the vegetative efficiency of the gametophyte is not greater than that of the sporophyte. The life history in which there is 1 reduction division following fertilization directly is that of primitive organisms, while that of fertilization followed by a sporophyte giving many reduction divisions

is more evolved. The gradual reduction of the gametophyte has occurred because this form has become increasingly unnecessary.—*Wm. Randolph Taylor.*

6482. VIRIEUX, J. Structure et division cellulaires chez *Coscinodiscus Grani*. [Structure and cellular division in *C. Grani*.] Bull. Biol. France et Belgique 54: 58-60. Fig. 1-6. 1920.—Studies of cytology, structure, and nuclear division of diatoms have been based mostly on fresh water species. The pelagic dredging of Wimereux yielded a great quantity of *C. Grani* Good. The nucleus, subcentral in repose, is seen as a voluminous, easily stained caryosome in a clear envelope. Surrounding it is a mass of rather compact protoplasm with prolongations reaching toward the valves and making connection with the parietal chromatophores. At the time of division the caryosome becomes more or less obliterated and its parts are aggregated in 2 masses of granules. Only in this brief stage is anything found which resembles chromosomes. The caryosomes shortly form again, withdraw toward the 2 poles, and become fixed against the valves with only a bridge of protoplasm uniting them. Two new valves then form at the equator and do not at once break the continuity of the protoplasm, strands of which extend through the large hexagonal pores of the valvular poles. The 2 daughter cells are united for a time in the maternal envelope, and only when they separate do the nuclei move to the centers of the new cells.—*A. Chase.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 6226, 6232, 6241, 6246, 6514, 6647, 6649, 6657, 6727)

6483. DISMIER, G. Additions à la flore bryologique des Alpes-Maritimes et du Var. [Additions to the bryophyte flora of the Maritime Alps and the Var.] Bull. Soc. Bot. France 67: 35-47, 113-120. 1920.—The present paper is supplementary to an earlier work on the bryophytes of the French department of the Maritime Alps published in 1915. It records the results of explorations carried on by the author during the winter of 1916-17, using Cannes as a base of operations. The region studied extended from Antibes to Aguay and was almost wholly coastal in character, the most inland station visited being scarcely 10 km. from the Mediterranean. The author first lists, as new to continental France, *Acaulon mediterraneum* Limpr., *Pottia commulata* Limpr., and *Rhynchostegiella Letourneurii* (Besch.) Broth. The last is of especial interest, having been previously recorded only from Algeria and Morocco. It includes, however, as synonyms, *Eurhynchium curvisetum* var. *laevisetum* Nich. & Dix., of Portugal, and *Rhynchostegiella littorea* var. *brevifolia* Amann, of southern France, so that it is not actually new either to Europe or to France. He then lists, with definite stations, 54 mosses and hepatics as new to the department of the Maritime Alps and 31 as new to the department of the Var.—*A. W. Evans.*

6484. DISMIER, G. Les Muscinées du Valentinois méridional (Drôme). [The bryophytes of southern Valentinois (Drôme).] Bull. Soc. Bot. France 68: 241-248. 1921.—In 1918 the author made a protracted stay at Étoile-sur-Rhône, near Valence, in the department of the Drôme, France, and carefully explored the surrounding country for bryophytes. The region is dry, sparsely wooded, and almost destitute of rocks, while the range in altitude is comparatively slight. In spite of these rather unfavorable conditions 170 mosses and 31 hepatics were collected, and these are listed in full, since the bryophytes of the Drôme were previously unknown. Although the species are predominantly southern in distribution a few northern species are represented. The following are of especial interest: *Amblystegium riparium* var. *trichopodium* Br. Eur., *Aschisma carniolocum* (W. & M.) Lindb., *Cheilothela chloropus* Lindb., *Didymodon cordatus* Jur., *Phascum mitraeforme* (Limpr.) Warnst., and *Zygodon Forsteri* (Dicks.) Wils.—*A. W. Evans.*

6485. DISMIER, G. Une mousse nouvelle pour la France dans la Drôme: *Orthotrichum Shawii* Wils., et présence aux environs de Valence des *Camptothecium aureum* Br. Eur. et *Epipterygium Tozeri* (Grev.) Lindb. [*Orthotrichum Shawii*, a moss new to France in the Drôme, and the occurrence in the vicinity of Valence of *Camptothecium aureum* and *Epipterygium Tozeri*.] Bull. Soc. Bot. France 69: 321-325. 1922.—The author reports the presence of *Orthotrichum Shawii* in the vicinity of Die, in the department of the Drôme, France. This rare species was previously known only from Scotland, northern Germany, and Corsica. Of the other 2 species noted in the title, *Camptothecium aureum* has a wide Mediterranean distribution but was previously unknown in the interior of France, while *Epipterygium Tozeri* was likewise supposed to be restricted to coastal regions. The latter species consistently avoids calcareous rocks.—A. W. Evans.

6486. SHOWALTER, AMOS M. Studies in the morphology of *Riccardia pinguis*. Amer. Jour. Bot. 10: 148-166. Pl. 16-19, 3 fig. 1923.—This species is cosmopolitan and varies somewhat under different environments. It is probably dioecious but male and female thalli may be distinguished only by their reproductive branches or the presence or absence of sporophytes. Discharged spores do not ordinarily adhere in tetrads. The growth of the thallus is apical, by means of a "two-faced" apical cell, which gives rise to segments alternately from its right and left cutting faces. The early divisions of the primary segment of the apical cell follow the scheme of Leitgeb (1877). The axial row of the archegonium develops from a mother cell which divides to form a central cell and a neck-canal mother cell; the latter divides once, increasing the axial row to 3 penultimate cells, which divide in acropetal succession forming ultimately an egg, a ventral canal cell, and 4 neck-canal cells. Disintegrating archegonia were numerous in the material here studied, the egg and the ventral canal cell frequently breaking down before the maturity and disintegration of the neck-canal cells. The young embryos show an order of division slightly different from that reported by Miss Clapp (1912). A massive "calyptra" is formed around the sporophyte by the rapid growth and division of the cells of the venter and of the cells of the thallus immediately below the archegonium.—E. W. Sinnott.

6487. STEIL, W. N. The antherozoid of the genus *Riccardia*. Bull. Torrey Bot. Club 50: 197-201. 5 fig. 1923.—The antherozoids of *Riccardia pinguis*, *R. multifida*, and *R. palmata* are described and figured. It is shown that the 2 cilia are unequal in length and attached at different points close to the anterior end of the long and slender body. The author makes the statement that "the nature of the cilia of the antherozoid suggests a possible heterokont relationship."—P. A. Munz.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

DONALD S. WELCH, *Assistant Editor*

(See also in this issue Entries 6241, 6514, 6520, 6523, 6528, 6530, 6533, 6534, 6542, 6547, 6595, 6612, 6647, 6649, 6657)

FUNGI

6488. BISBY, G. R., AND A. H. R. BULLER. Preliminary list of Manitoba fungi. Trans. British Mycol. Soc. 8: 91-109. 1923.—The list contains 574 fungi: myxomycetes, 34; bacteria, 8; phycomycetes, 20; ascomycetes, 62; imperfect fungi, 38; smuts, 20; rusts, 80; polypores, 63; agarics, 108; Thelephoraceae, 36; other basidiomycetes, 57; and lichens, 48.—W. B. McDougall.

6489. B[ROOKS], F. T. [Rev. of: GWYNNE-VAUGHAN, DAME HELEN. *Fungi: Ascomycetes, Ustilaginales, Uredinales*. ii + 232 p., 196 fig. Cambridge University Press: 1922 (see Bot. Absts. 11, Entries 2707, 4253).] Trans. British Mycol. Soc. 8: 109-110. 1923. [See also Bot. Absts. 11, Entry 4247; 12, Entry 1968.]

6490. CUNNINGHAM, G. H. A singular *Cordyceps* from Stephen Island, New Zealand. Trans. British Mycol. Soc. 8: 72-75. Fig. 1-3. 1923.—*Cordyceps Kirkii* is described as new.—W. B. McDougall.

6491. ELLIOTT, W. T. Some observations on the mycophagous properties of slugs. Trans. British Mycol. Soc. 8: 84-90. 1923.—Observations were made during 4 years using 10 species of slugs and 60 species of fungi. The results, given in tabular form, show that of the 10 species of slugs 3 are extremely partial to fungous food, 1 feeds only on lichens, 1 eats fungi only under compulsion, and the other 5 feed upon fungi as readily as upon various other kinds of food. Fungi that are poisonous to man are not avoided by slugs. Slugs are partial to all species of *Russula* but they refuse tough and hard fungi, such as *Scleroderma vulgare* and *Panus stypticus*.—W. B. McDougall.

6492. FITZPATRICK, HARRY MORTON. Monograph of the Nitschkieae. Mycologia 15: 45-67. 1923.—This is a continuation of the study previously noted [see Bot. Absts. 12, Entry 4199.] The 4 remaining genera are described and the following species noted. Under *Calyculosphaeria* nom. nov. (*Winterella* Berl.) *C. calyculus* (Mont.) comb. nov., *C. pezizoidea* (Pat. & Gaill.) comb. nov., *C. collapsa* (Romell) comb. nov., and *C. macrospora* sp. nov. are described; under *Tympanopsis* the species described are *T. euomphala* (B. & C.) Starbäck, *T. coelosphaerioides* Penz. & Sacc., and *T. uniseriata* sp. nov.; under *Thaxteria* the species described are *T. leptosporoides* (Wint.) comb. nov., and *T. didyma* (Speg.) Sacc.; under *Acanthonitschkea* the species *A. argentinensis* Speg. and *A. macrobarbata* sp. nov. are described.—H. R. Rosen.

6493. GÄUMANN, ERNST. Mykologische Mitteilungen. [Mycological contributions.] Bull. Jard. Bot. Buitenzorg III, 3: 121-127. Fig. 1-4. 1921.—The author describes 3 new species of fungi, *Triphragmium Trevesiae*, *Gloeosporium tremellinum*, and *Ravenelia Erythrinae*, and gives additional information on *Hamaspora gedeana* Rac.—Alfred Rehder.

6494. GLEISBERG, W. Zur Revision der Gattung *Pestalozzia* de Not. [Contribution to a revision of the genus *Pestalozzia*.] Ber. Deutsch. Bot. Ges. 39: 79-83. Fig. 1. 1921.—While investigating a species of *Valsa* on *Thuja occidentalis* a species of *Pestalozzia* was found. Study showed that it conforms equally to the descriptions of 3 distinct species of *Pestalozzia* as diagnosed by Saccardo, namely, *P. funeria*, *P. foedans*, and *P. Conigena*. The plant should be called *P. funeria* because of the priority of this name but this study shows that the diagnosis of species of *Pestalozzia* as given by Saccardo is inadequate and the whole genus is in great need of revision. Attempts to infect living plants of *Thuja* with *P. funeria* were unsuccessful and the fungus is considered a harmless saprophyte.—W. B. McDougall.

6495. LINGELSHEIM, ALEXANDER. *Stilbella Arndtii*, ein neuer entomogener Höhlenorganismus aus Schlesien. [*Stilbella Arndtii*, a new entomogenous cave organism from Silesia.] Ber. Deutsch. Bot. Ges. 39: 149-151. 1921.—Several fruit-bodies of *Mycena filopes* Bull. were found in caves in Silesia. *Stilbella Arndtii*, found growing upon *Heleomyza serratae* L., is described as new. This is the first entomogenous species of the genus *Stilbella* to be reported from Central Europe and only 4-5 entomogenous species are known from other parts of the world, most species of the genus having been reported as growing upon plants. It is suggested that further studies may reveal other interesting relations between cave fungi and cave animals.—W. B. McDougall.

6496. MURRILL, W. A. *Poria Cocos* (Schw.) F. A. Wolf. Mycologia 15: 105-106. 1923.—The author notes a yellowish *Poria* found associated with a large sclerotium which had been found attached to dead roots of *Eucalyptus*.—H. R. Rosen.

6497. OVEREEM-DE HAAS, C. VAN, UND D. VAN OVEREEM-DE HAAS. Verzeichnis der in Niederländisch Ost-Indien bis dem Jahre 1920 gefundenen Myxomycetes, Fungi und Lichenes. [Enumeration of the myxomycetes, fungi and lichens collected up to 1920 in the Dutch East Indies.] Bull. Jard. Bot. Buitenzorg III, 4: 1-146. 1922.—The authors state that the enumeration is based chiefly on literature which is very scattered and difficult of access and that it is not intended to be critical. The enumeration contains 91 Myxomycetes, 2,232 Fungi, and 503 Lichenes. An index to the literature cited concludes the paper.—*Alfred Rehder.*

6498. REA, CARLETON. Presidential address. A brief review. Trans. British Mycol. Soc. 8: 11-22. 1922.—This paper presents a summary of the main advancements that have been made in mycology since the founding of the British Mycological Society 25 years ago.—*W. B. McDougall.*

6499. STEVENS, F. L., AND RUTH I. DOWELL. A *Meliola* disease of cacao. Phytopathology 13: 247-250. Fig. 1-3. 1923.—At Coverden, British Guiana, a leaf spot of *Theobroma cacao*, due to *Meliola guianensis* n. sp., was found in abundance. The *Meliola* was in some instances overgrown by *Helminthosporium guianensis* n. sp., and by *Nectria portoricensis* Stev.—*B. B. Higgins.*

6500. WAKEFIELD, E. M. The Worcester foray. Trans. British Mycol. Soc. 8: 1-8. 1922.—This is a report of the 25th annual meeting and foray of the British Mycological Society held at Worcester, Sept. 19-24, 1921. A complete list of the fungi collected, numbering about 435 species, is given.—*W. B. McDougall.*

6501. WEESE, J. Über die Gattungen *Ophiosphaeria* W. Kirschst., *Acanthophiobolus* Berl. und *Ophiochaete* Sacc. [On the genera *Ophiosphaeria*, *Acanthophiobolus*, and *Ophiochaete*.] Ber. Deutsch. Bot. Ges. 39: 114-120. 1921.—The relationships and synonymy of the 3 genera are fully discussed. It is concluded that with a proper rearrangement of species the genera *Ophiosphaeria* and *Acanthophiobolus* should be retained while *Ophiochaete* should be relegated to synonymy.—*W. B. McDougall.*

6502. WEESE, J. Über einige Ascomyceten aus dem Mährisch-schlesischen Gesenke. [On some Ascomycetes from Silesia.] Ber. Deutsch. Bot. Ges. 39: 108-113. 1921.—*Nectria tricolor* Höhnelt is discussed and described in detail. *Epicymatia episphaerica* Niessl is found to be identical with *Berlesiella parasita* (Fabre) Höhnelt, and *Meliola sudetica* Niessl is believed to be identical with *M. nidulans* (Schweinitz) Cooke.—*W. B. McDougall.*

6503. WOLLENWEBER, H. W. Zur Systematisierung der Strahlenpilze. (Gattung *Actinomyces* Harz.) [The systematic arrangement of the radiating fungi. The genus *Actinomyces* Harz.] Ber. Deutsch. Bot. Ges. 39: 26-30. 1921/1922.—The genus is divided into 5 sections: the 1st sclerostroma, distinguished from the others by the presence of sclerotia; the others separated on the basis of the color of the conidia. In the 2nd section, poliophaeospora, the conidia are gray to brown; in the 3rd, leucospora, white, yellowish or greenish white; in the 4th, erythrinospora, red or reddish, and in the 5th, glaucospora, blue. Most of the species belong to the section leucospora and this section is further subdivided.—*W. B. McDougall.*

LICHENS

6504. KNIGHT, H. H. Lichens found during the Worcester Foray. Trans. British Mycol. Soc. 8: 10. 1922.—A list is given of 46 species of lichens collected during the Worcester Foray, Sept. 21-24, 1921.—*W. B. McDougall.*

6505. LINDAU, G. Lichenes novo-guineenses. Bot. Jahrb. 58: 250-254. 1923.—This is No. 84 of Series X of the Beiträge zur Flora von Papuasien. Ledermann's collection, so rich in phanerogams, furnished no new species of lichens. Thirty-one species in 18 genera are listed, accompanied by notes on distribution.—*K. M. Wiegand.*

6506. RIDDLE, LINCOLN W. The lichens of the Isle of Pines. *Mycologia* 15: 68-88. Fig. 1. 1923.—A list is given of 127 species in 49 genera, "of which 1 genus, 14 species, and 1 variety are new. Of the new species, 11 grow on rocks." A Latin description is given for every new form. The new genus, *Monoblastia*, belongs to the family Pyrenulaceae. The new species are: *Thrombium echinulosporum*, *Microglaena Brittonii*, *Monoblastia palmicola*, *Porina macrocarpa*, *P. subfirmula*, *P. Wilsonii*, *Opegrapha oleaginea*, *Leptotrema polyporum*, *Phyllospora cryptocarpa*, *Anema bullata*, *Blastenia Brittonii* Zahlbr., *Buellia Brittoniae*, *B. flavogranulosa*, and *B. subdispersula*. The new variety is *Opegrapha lithyrgea* var. *notha*. The following new combinations occur: *Microglaena scopularis* (Wainio), *Phylloporina dilatata* (Wainio), *Ocellularia subtilis* (Tuck.), *Leptotrema simplex* (Tuck.), *Bacidia microphyllina* (Tuck.), *Bilimbia Sprucei* (Muell. Arg.), *Phyllopsora isidiotyla* (Wainio), and *Thyrea cubana* (Tuck.).—H. R. Rosen.

BACTERIA

6507. CROW, W. B. The structure and affinities of *Leuconostoc mesenteroides* (Cienkowski) Van Tieghem. *Trans. British Mycol. Soc.* 8: 76-84. Fig. 1-2. 1923.—*Leuconostoc mesenteroides*, which occurs most commonly as gelatinous masses in vats in sugar beet factories, is discussed in detail from cultural, structural, and microchemical points of view. The conclusion is reached that *Leuconostoc* is not closely related to any of the algae but is allied to certain bacteria and should be provisionally placed in the Coccaceae.—W. B. McDougall.

6508. FROBISHER, MARTIN, JR. A comparative study of media for the quantitative estimation of bacteria in milk. *Amer. Jour. Public Health* 13: 474-478. 1923.—The media studied were the medium of the American Public Health Association, lactose agar, milk-powder agar, milk-powder-yeast agar, and milk-powder agar with the addition of 1 per cent lactose. "The milk-powder agar and lactose agar are apparently the media of preference for routine work." All enriched media gave a higher count of larger, more uniform colonies than the standard medium. There was also less variation in counts by different individuals and more opportunity for differentiation of species.—C. A. Ludwig.

6509. GICKLHORN, JOS. Zur Morphologie und Mikrochemie einer neuen Gruppe der Purpurbakterien. [On the morphology and microchemistry of a new group of the sulphur bacteria.] *Ber. Deutsch. Bot. Ges.* 39: 312-319. 1921.—Two new species of sulphur bacteria are described. They are peculiar in containing, together with sulphur, large quantities of calcium carbonate, up to 60 per cent of the total volume. They are: *Chromatium Linsbaueri* n.sp. and *Rhabdochromatium Linsbaueri* n.sp. The author places them in the group "lime bacteria."—S. F. Cook.

MYXOMYCETES

6510. LISTER, G. List of Mycetozoa found during the Worcester Foray. *Trans. British Mycol. Soc.* 8: 8-9. 1922.—After brief mention of some of the more important finds, a list of 38 species of Myxomycetes collected during the Worcester Foray, Sept. 19-23, 1921, is given.—W. B. McDougall.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See also in this issue Entries 6251, 6457, 6480, 6481, 6593, 6647, 6683, 6694)

6511. COLLINS, G. N. An ear of prehistoric maize that resembles the fossil form, *Zea antiqua*. *Jour. Heredity* 14: 61-64. 2 fig. 1923.—The ear was found by Colonel John W. Gulick, in a prehistoric grave near Arica, Chile. The "Arica ear" is somewhat smaller than the fossil ear described by Knowlton, but presents practically the same characteristics. The grains are arranged in approximately 20 rows, and although quite small they contain true

starch, unlike the majority of small-grained varieties today. The ear does not throw much light on the origin of maize, but it does show that nearly all the steps in developing maize as we know it today were taken at least as early as the time of the "Arica ear."—*R. C. Cook.*

6512. CONWENTZ, H. Über zwei subfossile Eibenhorste bei Christiansholm, Kreis Rendsberg. [Two subfossil yews at Christiansholm.] *Ber. Deutsch. Bot. Ges.* 39: 384-390. 1921.—The occurrence of the yew is noted outside the present range in prehistoric time. Boles and stumps of a pine-yew-oak forest floor were earlier noted at a depth of 1 m. in sphagnum turf of lowlands of Hannover, where only a single pair of wild trees is now known. Yew wood was much used in the prehistoric wooden utensils from Jütland, Seeland, Fünen, and Bornholm. Old or sub-geologic forests of oak, yew, and other trees are found near the surface of the sandy soil about Christiansholm. Quite recent, marked restriction of the yew is indicated. Some of the material is charred.—*G. R. Wieland.*

6513. HOLLICK, ARTHUR. The taxonomic and morphologic status of *Ophioglossum Alleni* Lesquereux. *Bull. Torrey Bot. Club* 50: 207-213. *Pl.* 10-12. 1923.—The fossil plant from the shales of Florissant, Colorado, originally described by Lesquereux as *Ophioglossum Alleni* and later referred by him to *Salvinia*, has also been placed under the following genera: *Tmesipteris*, *Carpolithes*, *Phyllites*, and *Brachyruscus*, the last named genus being in the Spermatophyta. The present paper gives data to show that *Carpolithes Alleni* (Lesquereux) Cockerell is "properly applicable."—*P. A. Munz.*

6514. Мейер, К. И. [MEYER, K. I.] Происхождение наземной растительности. [The origin of the land vegetation.] 75 p., 60 fig. Государственное издательство, Москва. [Edition of the State, Moscow.] 1922.—In this book by a Russian liverwort specialist, there is an exposition of the change of generations and origin of land flora; also the views of Pringsheim, Celakovsky, Bower, Potonie and Davis, and modern data of change of generations in cellular plants are considered. The author examines the present status of the question of the origin of land vegetation and gives a theoretical characterization of the ancestor of land plants. This ancestor is an alga, showing a dichotomous branching of thallus, with homotypical Dictyota-type-alternation of generations. The gametophyte produces a gametangium having the character of a many-chambered sporangium. The other generation—the sporophyte—has sporangia or, it is possible, tetrasporangia. The author tries to represent a possible way of evolution, which the alga-type, mentioned above, followed when it became terrestrial. Both the Bryophyta and Pteridophyta have developed from the same prototype, but their ways of evolution diverged at the very beginning and this has brought about the principal difference between them. The author represents the hypothetical ancestor of the Bryophyta—the Protosphaerocarpus. It is like a sphaerocarpus, but without sexual differentiation in the thallus, with antheridia and archegonia on the same thallus. This type has left the water. The many-chambered sporangia were transformed according to Davis' theory, into the antheridia and archegonia. The bryophyte sporangium is a total generation, the rest of the sporophytic thallus. The first phase of the phylogenetical branch, Pteridophyta-Gymnospermae-Gyneciateae, is the transformation of the dorsiventral thallus in the radial vertical shoot. The evolution of this branch has proceeded under the influence of factors established by Bower.—*V. Lashevsky.*

6515. METCALF, W. An ancient pine cone. *Amer. Forest.* 29: 172. 1 fig. 1923.—A cone from a Knobcone pine estimated to have been buried in the ground for 40-50 thousand years is compared with the cone of the same species of today.—*Chas. H. Otis.*

PATHOLOGY

FREDERICK V. RAND, *Editor*LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 6152, 6156, 6182, 6193, 6202, 6217, 6241, 6247, 6248, 6262, 6269, 6271, 6297, 6305, 6316, 6365, 6378, 6387, 6391, 6426, 6430, 6447, 6455, 6471, 6476, 6488, 6489, 6490, 6491, 6494, 6495, 6497, 6498, 6499, 6503, 6612, 6613, 6617, 6635, 6636, 6639, 6642, 6694, 6696, 6726, 6733, 6734, 6736)

DISEASES CAUSED BY FUNGI

6516. ANONYMOUS. Pine blister disease in Europe. *Amer. Forest.* 29: 244. 1923.—This is an interview with Perley Spaulding concerning his 8-months' study of blister-rust conditions in Europe. The disease has been known in Switzerland since 1854, but has become widely destructive only within the last 10 years. The black currant, almost universally cultivated, is the most susceptible and dangerous host in both Europe and America.—*Chas. H. Otis.*

6517. ANONYMOUS. Report of the proceedings and recommendations of the eighth annual blister rust conference held in Boston, Massachusetts, Feb. 8-10, 1923. 126 p. (*mimeographed*). 1923.—This report comprises discussions by various investigators as to "our object and its attainment," State, Federal, and Canadian policies as regards white pine blister rust, educational work, problems of blister rust agents, scientific investigations, and 7 special papers. [A full report of the preceding conferences was never published or mimeographed. A résumé of most of them will be found in *The American Plant Pest Committee Bull.* 2, 4, and 6 covering the years 1918-1920 (see *Bot. Absts.* 3, Entries 393, 396, 409, 411, 416, 417; 7: 1140, 1203, 1224, 1246; 10: 1277, 1307); in the bulletin on white pine blister rust published by the Committee on Suppression of the White Pine Blister Rust in North America, covering the year 1917 [1918]; and in New York Conservation Commission Bull. 15, entitled "The pine blister," by B. H. Paul, covering the year 1916. No blister rust conference was held in 1921 or 1922].—*Frederick V. Rand.*

6518. ANONYMOUS. Studies on Phytophthoras. [Rev. of: (1) BRUYN, HELENA L. G. DE. The saprophytic life of Phytophthora in the soil. Mededeel. Landbouwhoogeschool Wageningen 24: 4-37. 8 fig. 1922. (2) LÖHNIS, M. P. Onderzoek over Phytophthora infestans (Mont.) de By. op de aardappelplant. H. Veenman: Wageningen, 1922 (see *Bot. Absts.* 12, Entries 1241, 4270).] *Nature* 111: 305. 1923.—The former contains no information "as to whether *P. infestans* was found to live and grow in unsterilized soil; and speculation as to whether the survival of this fungus in the soil from season to season may account for primary outbreaks of potato blight seems altogether too premature."—*O. A. Stevens.*

6519. A., S. F. The Sclerospora disease of sugar-cane in Formosa. *Agric. News [Barbados]* 20: 382-383. 1921.—Downy mildew of sugar-cane (*Sclerospora Sacchari* Miyake) is described as to history, symptoms, the parasite, injury caused, other crops affected, and control. [Cf. also *Agric. News* 21: 79. 1922; and, *Sugar* 24: 619. 1922].—*Frederick V. Rand.*

6520. BOURNE, B. A. Researches on the root disease of sugar cane. Rept. Dept. Agric. Barbados. 17 p., 5 pl. [1922?].—This disease is not confined to any type of soil. With existing agricultural methods plant canes do not appear to be seriously attacked, but ratoon canes seem to be especially susceptible under certain conditions. *Rhizoctonia Solani* and *R. pallida* have both been found associated with newly infected and dying cane roots in typical cases of root disease and also in advanced stages of the disease, and both fungi have been proved by inoculation tests to cause typical root disease. Inoculations with *Marasmius Sacchari* and with *Fusarium* sp. have invariably given negative results. Furthermore, *Marasmius Sacchari* has never been isolated from freshly diseased and dying cane roots, only from dead

roots.—Cultural characters of the 2 species of *Rhizoctonia* are given.—Recommendations for control comprise the use of resistant varieties and healthy cuttings from plants free of disease, proper crop rotation, tillage and drainage, and proper “trashing” of fields of young plant and ratoon canes to conserve soil moisture and to keep down the temperature.—*Frederick V. Rand.*

6521. BRISLEY, HAROLD ROY. Studies on the blight of cucurbits caused by *Macrosporium cucumerinum* E. & E. *Phytopathology* 13: 199–204. *Fig. 1–3.* 1923.—This leaf blight has recently produced serious damage to the cantaloupe [*Cucumis melo* L.] crop in Arizona. The first noticeable evidence of the disease on leaves is a small tan-colored spot the size of a pin head at the point of infection. The spots enlarge until they coalesce and kill the entire leaf. The older spots are made up of concentric dark and lighter colored rings, with always the lighter center. A fruit rot is also produced on over-ripe fruits on diseased vines. Infections were produced by artificial inoculations on leaves of cantaloupe, squash, watermelon, cucumber, Irish potato, and tomato. Apparently the parasite is carried through the winter by the mycelium in dead plant tissue.—*B. B. Higgins.*

6522. BRYCE, G. The toxicity of lime to *Fomes lignosus* Klotzsch. *Dept. Agric. Ceylon Bull.* 64. 17 p. 1923.—*Fomes lignosus* is the causative organism of a serious root disease of para rubber (*Hevea brasiliensis*). The results obtained demonstrate that quicklime applied to the soil has little fungicidal value for *Fomes lignosus*.—*E. D. Merrill.*

6523. CHUPP, CHARLES, AND GRACE L. CLAPP. *Fusicoccum* canker on apple. *Phytopathology* 13: 225–230. *Pl. 12.* 1923.—An apparently new canker disease of apple trees was found on nursery stock in storage at Newark, New York. Black cankers appeared at or near the bud union and occasionally further up the stem. Isolations from canker tissue gave a species of *Fusicoccum* capable of reproducing the disease. The fungus, after comparison with specimens and descriptions of similar pycnidial fungi, is considered a new species and is here described as *Fusicoccum Pyrorum*. It does not seem to be very actively parasitic. In every case observed, affected trees have been in a weakened condition previous to infection.—*B. B. Higgins.*

6524. CLAYTON, EDWARD E. The relation of soil moisture to the *Fusarium* wilt of the tomato. *Amer. Jour. Bot.* 10: 133–147. *Pl. 13–15.* 1923.—Tomato plants were grown in crocks of sterilized soil inoculated with a spore suspension of *Fusarium Lycopersici* Sacc. By weighing, in certain cases, and by the auto-irrigator, in others, the soil was held at moisture contents of 13–35 per cent, the latter value representing complete saturation. Plants growing in soil with a low moisture content (13–19 per cent) became infected readily but were very resistant, the disease progressing slowly. Those grown in saturated soil were entirely immune to attack, infection never taking place. This immunity seems to be related to the almost complete absence of nitrates in the tissues of the host plant under these conditions. Vigorous, rapidly growing plants, produced when soil moisture was optimum for growth, were attacked vigorously, but these could be rendered disease-resistant by allowing the soil to become very dry. Plants soon lost their resistance or immunity when the moisture content of the soil became such as to stimulate vigorous growth.—*E. W. Sinnott.*

6525. CZARNECKI, HELEN. Studies on the so-called black heart disease of the apricot. *Phytopathology* 13: 216–224. *Pl. 11, fig. 1–4.* 1923.—A new disease of apricots [*Prunus armeniaca* L.] and of almonds [*Prunus amygdalus* Stokes] is reported from California. The disease is characterized by a sudden wilting of the leaves, the only external symptom, and by the blackening of the heart wood. It usually appears first in June when its presence is manifested by a sudden wilting at the tip of 1 or more branches. The wilting spreads back and the entire tree is soon killed. The disease is most common on young trees. Many isolations from diseased wood from various localities have shown the constant association of a species of *Verticillium*; and inoculations of this fungus into healthy trees have reproduced the disease.—*B. B. Higgins.*

6526. DETMERS, FRED A. *Dothichiza* canker on Norway poplar. *Phytopathology* 13: 245-247. Pl. 13. 1923.—A canker of Norway poplar (*Populus Eugenei* Simon-Louis) caused by *Dothichiza populea* Sacc. & Briard is here recorded for the 1st time, though cankers produced by this fungus are common on other species of poplar. In a large planting of Norway poplar in Ohio the young trees were so badly damaged that they were dug up and burned.—*B. B. Higgins.*

6527. DICKSON, JAMES G. Influence of soil temperature and moisture on the development of the seedling blight of wheat and corn caused by *Gibberella Saubinetii*. *Jour. Agric. Res.* 23: 837-870. Pl. 1-6 (1 and 2 col.), fig. 1-15. 1923.—*Gibberella Saubinetii* causes a seedling blight of both maize [*Zea*] and wheat [*Triticum*]. The disease develops from infected seed, scabbed seed in the case of wheat, and from infested soil. It appears (1) as a blight of the seedlings prior to emergence from the soil (commonly spoken of as poor germination), (2) as a blight after emergence with resulting yellow and wilted seedlings, and (3) as a dwarfing of the seedlings due to weakened root systems. The extent of blighting is in direct proportion to the amount of infestation, environmental factors being equal. The most important environmental factor in determining seedling blight is soil temperature. The pathogen in pure culture has a wide temperature range of growth, varying from 3 to 32°C. The optimum temperature for spore germination, vegetative development, and sporulation is about 24°C. on unacidified media, and 28°C. on acidified media. Wheat develops best at low soil temperatures while maize develops best at high soil temperatures. The most favorable soil temperature for the blighting of wheat ranges from 12 to 28°C., below which blighting seldom occurs. The most favorable soil temperature for the blighting of maize ranges from 8 to 20°C., while above 24°C. no blighting occurs. Low moisture is most favorable for blight of wheat, even at low soil temperatures. Results of experiments in sowing maize and wheat in the field at various dates, and recording soil moisture and temperature are in accord with the above results obtained in the greenhouse. The mean daily soil temperature in the field corresponds to the constant soil temperature in the greenhouse. There is a sharp critical temperature for both the blight of maize and wheat. This is between 20 and 24°C. for maize and about 12°C. for wheat. The seedlings become susceptible to the pathogen when they are unable to respond favorably to the environment.—*W. H. Burkholder.*

6528. DOWSON, W. J. Contributions from the Wisley Laboratory. XLI.—The wilt disease of Michaelmas daisies. *Jour. Roy. Hort. Soc.* 48: 38-57. Fig. 11-18. 1923.—The cause of this disease was found to be a fungus of the genus *Cephalosporium* working in the water conducting tissue. It produces a toxic substance which causes yellowing and dying of the leaves. Control of the disease is based on experimental results showing that (1) healthy plants may be grown from suckers taken from diseased stock; (2) the disease rarely kills plants the 1st season; and (3) the fungous mycelium is localized in the base of the plant during spring and early summer and does not occur in the suckers. A technical description of the causal organism, *Cephalosporium Asteris* n. sp., is given, followed by a list of 13 references to literature.—*J. S. Bailey.*

6529. EARLE, F. S. Sugar cane root disease. A neglected enemy of cane and ways of controlling it. *Facts about Sugar* 16: 314. 1923. [See Bot. Absts. 11, Entry 2867.]

6530. FARIS, JAMES A. Anthracnose of the Boston fern. *Mycologia* 15: 89-95. Pl. 8-9. 1923.—From brown, withered tips of *Nephrolepis exaltata* growing in the Brooklyn Botanic Garden, a fungus was obtained in pure culture which when inoculated on healthy fronds produced the same symptoms. A description of both an imperfect (*Colletotrichum*) stage and a perfect (*Glomerella*) stage of the fungus is given. It is tentatively named *Glomerella Nephrolepis* sp. nov. Control measures are given.—*H. R. Rosen.*

6531. F[YSON], P. F. [Rev. of: SUNDARARAMAN, S. Helminthosporium disease of rice. *Agric. Res. Inst. Pusa Bull.* 128. 7 p., 4 pl. (2 col.). 1922 (see Bot. Absts. 12, Entry 6546).] *Jour. Indian Bot.* 3: 155. 1923.

6532. F[YSON], P. F. [Rev. of: SUNDARARAMAN, S. **The coconut-bleeding disease.** Agric. Res. Inst. Pusa Bull. 127. 8 p., 6 pl. (1 col.). 1922 (see Bot. Absts. 12, Entry 6547).] Jour. Indian Bot. 3: 155. 1923.

6533. GAINES, E. F., and F. J. STEVENSON. **Occurrence of bunt in rye.** Phytopathology 13: 210-215. Fig. 1-2. 1923.—*Tilletia Tritici* has been found occurring naturally in a few heads of Rosen rye (*Secale cereale* L.) and in wheat × rye hybrids. Artificial inoculations of seed of 9 varieties of rye showed 5 entirely immune. The other 4 produced some infected heads. The wheat × rye hybrids were much more susceptible. Spores from the smutted rye were much less virulent on wheat than were spores from wheat; and they failed to produce any infection on rye. It is suggested that *Tilletia Tritici* (Bjerk.) Wint. and *T. secalis* (Cda.) Kühn. are in reality the same fungus.—B. B. Higgins.

6534. HUNGERFORD, CHAS. W. **A Fusarium wilt of spinach.** Phytopathology 13: 205-209. Fig. 1-4. 1923.—A root rot and wilt of spinach [*Spinacia oleracea* L.], first noted at Moscow, Idaho, in 1919, is attributed to *Fusarium Spinaciae* n. sp. The leaves become pale yellow, the edges roll inward and die, and the entire plant succumbs within 2-3 weeks. Most of the fine fibrous roots of such plants are decayed. The vascular tissues in the main root and in the base of the stem are darkened.—B. B. Higgins.

6535. JONES, L. R., and J. C. WALKER. **Yellows-resistant cabbage varieties.** Some necessary precautions for seedsmen to consider in the production and distribution of seeds of new special strains. Seed World 13³: 20-21. 1 fig. 1923.

6536. LANSING, K. H. **Discovers how to control lettuce "drop" (*Sclerotinia libertiana*).** Formaldehyde treatment of seed beds found to be a very effective method of control. Seed World 12³: 20. 2 fig. 1922.—This control treatment including methods of application is made possible through the research work of W. S. BEACH and is here briefly described.—Frederick V. Rand.

6537. LEE, H. ATHERTON. **A disease of Satsuma and Mandarin orange fruits caused by *Gloeosporium folliculorum* Nishida.** Philippine Jour. Sci. 22: 603-615. Pl. 1 (col.), 1 fig. 1923.—A general discussion of the disease and the causative organism is presented. In Japan it has been observed to cause a loss of 20 per cent of the crop of the Wase Unshiu variety of orange. It seems to be confined to this one variety, but inoculation experiments have shown that at higher temperatures it affects other varieties of the Unshiu and the Mandarin oranges.—E. D. Merrill.

6538. LEE, H. ATHERTON, and F. B. SERRANO. **Banana wilt of the Manila hemp plant.** Phytopathology 13: 253-256. 1923.—A heart rot of Manila hemp plant (*Musa textilis* Neé) is produced by a *Fusarium*, apparently identical with *F. cubense* E. F. Smith. The fungus was readily isolated from tissue in early stages of decay, and in 1 series of 134 inoculations produced 66.41 per cent infections. A similar rot was produced in hemp plants inoculated with *Fusarium* from wilted banana plants. A comparison of the 2 organisms showed them to be similar morphologically and in cultural characters.—B. B. Higgins.

6539. LIESE, I. **Neue Beobachtung über *Cenangium abietis* Pers.** [Recent observations on *Cenangium abietis*.] Zeitschr. Forst.- u. Jagdw. 54: 227-229. 1 fig. 1922.—Under favorable conditions this saprophytic fungus attacks and kills young shoots of pine, gaining access through the buds. In this particular case, 1-year-old Scotch pine (*Pinus silvestris*) in a nursery in the forest range of Koppelsburg, Pomerania, was attacked. The disease manifested itself by the dying-off of the stem and leaves immediately below the terminal bud, and included the upper $\frac{1}{2}$ of the tree. Previous opinion commonly considered that only pines over 5 years of age were subject to attack. In general, the trees attacked recovered, and the disease may be considered as a temporary one, causing little destruction.—J. Roeser.

6540. LINE, J. The parasitism of *Nectria cinnabarina* (coral spot) with special reference to its action on red currant. Trans. British Mycol. Soc. 8: 22-28. Pl. 1. 1922.—*Nectria cinnabarina* is ordinarily not capable of infecting living portions of a red currant (*Ribes vulgare*) plant directly. It may occasionally gain entrance through wounds but the normal method of attack is by spreading through the wood cells from a dead portion into healthy wood. Injury is due to clogging of the wood cells by the fungus hyphae thus causing wilting and subsequent death of the parts above.—W. B. McDougall.

6541. [McCALLAN, E. A.] Snapdragon rust. Agric. Bull. Bermuda Dept. Agric. 26: 7. 1923.—A call is made for cooperation in eradicating the pathogen [*Puccinia Anterrhini*], and a plan of operation is outlined.—H. H. Whetzel.

6542. MILBRATH, D. G. Downy mildew on lettuce in California. Jour. Agric. Res. 23: 989-993. Pl. 1-3. 1923.—California conditions, especially in the winter months, are very favorable for the development of *Bremia Lactucae* on lettuce [*Lactuca*] and the mildew is widespread in the areas of commercial production. Affected heads do not stand shipment and storage as well as healthy ones.—The variety New York, which is most commonly grown, is very susceptible to the disease, while Iceberg, Big Boston, and Hanson are resistant.—During the cool months, December-March, and at a temperature of 10°C., conidia of *B. Lactucae* commonly germinate by means of swarm spores.—D. Reddick.

6543. MUNN, M. T. Further studies of the fungous associates of germination tests. Proc. Assoc. Official Seed Analysts North America 1920: 57-59. 1921.—The amount of moldiness, or fungous infestation, of seeds as shown in germination testing depends upon conditions of harvesting, character of the seed coat (whether smooth or rough), and the condition of the substratum used (whether sterile or foul with inert material and inoculum). The older and weaker the seeds the more subject they seem to be to attacks of fungi, being unable in many cases to germinate satisfactorily. Certain cases of low germination could be definitely traced to unsatisfactory conditions of weather and methods at the time the seeds were harvested, these facilitating bacterial and fungal infestation. Methods of seed treatment and the use of various chemicals and disinfectants need to be carefully reinvestigated before it will be safe and desirable to use them as an aid in measuring the viability of seed.—M. T. Munn.

6544. PASSY, PIERRE. Sur la gale des poires. [Pear scab.] Rev. Hort. 94: 71-72. Fig. 21-25. 1922

6545. SCILLEY, H. Leaf spot of sugar beets. Facts about Sugar 14: 500-501. 1922.—The leaf spot of sugar beets [*Cercospora beticola*] caused considerable loss in northern Colorado in 1921. Usually there is less loss in the northern part of the state than in the southern on account of the altitude and temperature. The disease does not develop below 70°F. Rotation of crops and later planting are advised as preventive measures.—C. W. Edgerton.

6546. SUNDARARAMAN, S. Helminthosporium disease of rice. Agric. Res. Inst. Pusa Bull. 128. 7 p., 4 pl. (2 col.) 1922.—Disease signs on the leaves consist of small spots with brownish centers bearing smoky black dots made up of spores and hyphae. These spots coalesce and sometimes the whole leaf withers, turns yellowish, and dries up. Continued rains and moist weather favor the spread of the disease. The nodes and glumes are also sometimes attacked. Microscopical examination, cultural and spore-germination studies, and inoculation experiments with this undetermined species of *Helminthosporium* are given. The fungus is said to be a weak parasite, and under normal conditions there is no serious loss of crop. [See also Bot. Absts. 12, Entry 6531.]—Frederick V. Rand.

6547. SUNDARARAMAN, S. The coconut-bleeding disease. Agric. Res. Inst. Pusa Bull. 127. 8 p., 6 pl. (1 col.) 1922.—The first external sign of disease consists in the oozing out of

a dark reddish brown fluid from cracks in the stem of an affected plant. This fluid turns black and dries. The tissue below decays and turns yellow, and later the whole internal tissue rots, no fruit is borne, the crown dwindles in size and the tree finally dies. The causal fungus, *Thielaviopsis paradoxa*, is described, and inoculation experiments and preventive measures are discussed. [See also Bot. Absts. 12, Entry 6532.]-*Frederick V. Rand.*

6548. TOOLE, E. H. Mould prevention in seed germinators. Seed World 11: 15. 1922.—Moldy seeds probably result from the growth of fungi introduced with the seed indicating that unfavorable conditions existed during the harvesting or early storage of the seed. Moldiness may or may not affect viability of seeds. Special attention should be given to seed-borne parasites. The laboratory and germinator should be kept free of old seed or other material which may supply mold spores. The germination chamber should be sterilized when there is a tendency for all samples to mold. As low a temperature for germination should be employed as the requirement of the seed will permit. If it becomes necessary to treat the seeds with chemicals before germination extreme care must be exercised. Complete sterility must be sacrificed to avoid seed injury.—*M. T. Munn.*

6549. VOLLERSTEN, CONRAD. Some facts about blight. Amer. Nut Jour. 17: 30-31. 1922.—None of the filbert varieties are immune to blight, but some European varieties show resistance. Blight can probably be controlled by cutting affected parts.—*E. L. Overholser.*

6550. WALKER, J. C. The hot water treatment of cabbage seed. Phytopathology 13: 251-253. 1923.—The results of several experiments indicate that cabbage seed infested with *Phoma lingam* (Tode.) Desm. may be completely freed of the fungus by treating 30 minutes with hot water at 50°C. Some injury to germination may be expected, depending upon the age and vigor of the seed.—*B. B. Higgins.*

DISEASES CAUSED BY BACTERIA

6551. LUTMAN, B. F. Potato scab in new land. Phytopathology 13: 241-244. 1923.—Several experiments are described in which clean potatoes [*Solanum tuberosum*] were disinfected and planted in new soil at the Vermont Experiment Station. In every case some scab developed. Poured agar-plate cultures from this new soil developed quantities of organisms of the *Actinomyces chromogenus* type. The results indicate the general occurrence of the organism in soils where potatoes have never been grown. It is believed that the organism is generally saprophytic on cellulose matter in the soil and that the parasitism on potatoes is merely secondary.—*B. B. Higgins.*

6552. MATZ, JULIUS. La gomosis de la caña. [Gummosis of sugar cane.] Sugar 24: 352-354. 1922.—This is a popular description of gummosis (*Bacterium vascularum*) with methods of control. A list showing the resistance or susceptibility of different varieties is included.—*C. W. Edgerton.*

6553. MATZ, JULIUS. The gumming disease of sugar cane. Facts about Sugar 15: 258-259. 1922.—The gumming disease of sugar cane, caused by *Bacterium vascularum*, is spreading rapidly in Porto Rico. It is especially common on the Otaheite variety. Some other varieties are resistant or immune. It is advised that the Otaheite variety be avoided.—*C. W. Edgerton.*

6554. SANFORD, G. B. The relation of soil moisture to the development of common scab of potatoe. Phytopathology 13: 231-236. Fig. 1-3. 1923.—During 2 years, potatoes [*Solanum tuberosum* L.] were grown in scab (*Actinomyces scabies*)-infested soil containing various degrees of moisture. During the 2nd year the H-ion concentration of the soil was determined at intervals. The results indicate that the moisture content of the soil is of greater importance than the H-ion concentration. Potato tubers grown in soil with a high moisture content were free from scab, while those grown in comparatively dry soil were badly scabbed, although the H-ion concentration was greater in the dry soil.—*B. B. Higgins.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

6555. ANONYMOUS. The Rhododendron bug. (*Leptobyrsa* (*Stephanitis*) *rhododendri*, Horv.) Jour. Ministry Agric. (London) 29: 555-558. 1 pl. 1922.—This insect is found upon Rhododendrons and in the U. S. A. on species of *Kalmia*. The obvious signs consist of chocolate-brown spots on the lower and a pale "freckling" on the upper leaf surface. The life-history, methods of control, and administrative measures are discussed.—*Frederick V. Rand*.

6556. BROCK, J. A. The principal foes of the sugar beet crop and their control. III. Sugar beet nematode. Facts about Sugar 15: 118-119. 1922.—This is a popular discussion of the nematode, its effect upon the beet, and methods of control.—*C. W. Edgerton*.

6557. BRYCE, G. Experiments with the green muscardine fungus on Rhinoceros beetle larvae. Dept. Agric. Ceylon Bull. 65. 7 p. 1923.—The green muscardine fungus (*Metarrhizium anisopliae* (Metch.) Sor.) is apparently not strongly pathogenic to rhinoceros beetle larvae. The fungus seems to be effective only on larvae that have been in captivity for a considerable period, and have accordingly suffered to some extent a reduction in vitality. The use of the fungus as a means of controlling the rhinoceros beetle on coconuts is therefore not recommended.—*E. D. Merrill*.

6558. DOCTERS VAN LEEUWEN, W. Some galls from Hongkong. Bull. Jard. Bot. Buitenzorg III, 4: 268-278. Fig. 1-20. 1922.—Thirty-four galls collected on various plants near Hongkong are described and 20 of them figured.—*Alfred Rehder*.

6559. DOCTERS VAN LEEUWEN, W. The galls of the islands of the Krakatau group and of the Island of Sebesy. Bull. Jard. Bot. Buitenzorg III, 4: 288-314. Fig. 1-20, map. 1922.—The author describes 82 galls collected on several small islands situated between Java and Sumatra which were completely devastated in 1883 by a volcanic eruption.—*Alfred Rehder*.

6560. DOCTERS VAN LEEUWEN, W. Ueber einige von Aphiden an *Styrax*-Arten gebildete Gallen. [Galls caused by aphids on species of *Styrax*.] Bull. Jard. Bot. Buitenzorg III, 4: 147-162. Pl. 1, fig. 1-16. 1922.—Eighteen different galls caused by aphids on various species of *Styrax* are described and most of them are figured.—*Alfred Rehder*.

6561. [EASTERBY, H. T.] Bureau of Sugar Experiment Stations. Combating insect pests. [Report of E. JARVIS at Meringa.] Australian Sugar Jour. 15: 148-150. 1923.—Satisfactory progress in experiments with paradichlorobenzene for control of cane grubs was obtained in plots at Greenhills, where first ratoons (*Badilla*) were treated with $\frac{1}{2}$ ounce injections placed 1 foot apart, 2 inches from stools and $4\frac{1}{2}$ inches deep on each side of rows. The cane was $4\frac{1}{2}$ feet high at the time of application. These experiments were made successfully, also, at Meringa, using D. 1135 first ratoons growing on volcanic soil infested with grubs. Exchanges of grub parasites have been made with Java. Cocoons of the Australian digger-wasp, *Campsomeris tasmaniensis* and *C. radula*, have been sent which are to control the ravages of scarabæid grubs,—*Lepidiota stigma* Fab. and *Leucopholis rorida* Fab.,—affecting cane and cassava crops. In exchange there will be sent 2 species of scoliid parasites from Java, for introduction into the cane fields to attack grubs of the grey-back cane beetle and of *Lepidiota frenchi*.—In Lower Burdekin successful field demonstrations have been made with carbon bisulphide as a soil fumigant for "white ants" attacking cane. [Cf. also: JARVIS, EDMUND. Work of the Division of Entomology. Ann. Rept. Bur. Sugar Exp. Sta. [Brisbane] 22: 52-56. 1922.]—*C. Rumbold*.

6562. FLINT, W. P. Shall we change our recommendations for San Jose scale control. Jour. Econ. Entomol. 16: 209-215. 1923.—During the years of 1920-1922, inclusive, the San Jose scale, *Aspidiotus perniciosus*, has increased very rapidly in southern Illinois and neighboring states. In southern Illinois it has resulted in the loss of over 1,000 acres of commercial orchard annually treated with lime sulphur.—Experimental work was carried out in the spring

of 1922 with miscible oil and lubricating oil emulsion, similar to those used by the Federal Bureau of Entomology in Florida. The lubricating oil emulsion gave nearly as good control of the scale as did the miscible oil and a much higher degree of control than was obtained from the best grades of liquid lime sulphur. As a result of this work the lubricating oil will be generally used in southern Illinois during the coming year.—*Author's abstract.*

6563. FRANCHINI, G. Essais d'inoculation de latex parasités aux souris blanches. Abcès du foie expérimentaux déterminés par les amibes des latex. [Inoculations of white mice with plant latex. Experimental abcess of the liver caused by amoebae from the latex.] Bull. Soc. Path. Exotique 16: 162-166. Fig. 1. 1923.—The parasitized latex of *Euphorbia* spp. and cultures of amoebae derived from plant latex were pathogenic to white mice when ingested or inoculated into the peritoneum.—*Philip Brierley.*

6564. HYSLOP, J. A. Insect pest survey work in the United States. Jour. Econ. Entomol. 16: 215-221. 1923.—After reviewing the history of survey work in the U. S. A. from 1889 to the present date, and recounting earlier attempts at this type of work by the U. S. Bureau of Entomology, the scope and objects of survey work are set forth. The main thesis brought forward is that survey work, i.e., the accurate recording of insect abundance from year to year, will indicate, after a reasonable number of years, the zone of optimum ecologic conditions affecting any given insect, and the yearly abundance of an insect will be determined by the departures from these optimum conditions.—*From author's abstract.*

6565. LUTMAN, B. F. An outbreak of hopper burn in Vermont. Phytopathology 13: 237-241. Fig. 1. 1923.—An outbreak of hopper burn, produced by the potato leaf hopper [*Empoasca mali*], on potatoes [*Solanum tuberosum*] is described. The injury to the potato leaves is compared with that produced by physiological tip burn. The author expresses the opinion that the leaf hopper extracts the juices from the vascular and adjoining tissues, causing them to become plasmolyzed to such an extent that they can not recover turgidity and so finally die.—*B. B. Higgins.*

6566. SASSCER, E. R. Important foreign insects collected on imported nursery stock in 1922. Jour. Econ. Entomol. 16: 152-158. 1923.—This paper is primarily a summary of the more important insects intercepted on foreign nursery stock arriving in the U. S. A. in 1922.—*From author's abstract.*

6567. THORNE, GERALD. Suggestions for control of nematode. Through the Leaves 1923: (March): 97-99. The Great Western Sugar Co.: Longmont, Colorado, 1923.—This popular article gives a brief description of the sugar beet nematode (*Heterodera schachtii*) with its habits and methods of control,—the latter based entirely on crop rotation and prevention of infestation. [Cf. also: Facts about Sugar 16: 192-193. 1923.]—*Frederick V. Rand.*

INFECTIOUS CHLOROSSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

6568. BRUNER, STEPHEN C. Mosaic and other cane diseases and pests in Cuba. Louisiana Planter 70: 452-455. Fig. 1-4. 1923.—The mosaic disease of sugar cane is present in many localities in Cuba but it does not seem to be spreading as rapidly nor doing as much damage as in some other countries like Porto Rico. The Crystalina cane, the variety which is largely grown in Cuba, is more resistant than many varieties. It is believed that the disease is not a menace to the Cuban sugar industry and that it can be controlled satisfactorily with immune and resistant varieties. Other cane diseases are mentioned very briefly.—*C. W. Edgerton.*

6569. BUTLER, E. J. Some characteristics of the virus diseases of plants. British Med. Jour. 1922: 963-964. 1922.—The diseases of plants caused by an ultramicroscopic agent or virus appear to fall into 4 main groups: (1) mosaics (the largest group); (2) the peach yellows group; (3) forms of variegation which can be transmitted by grafting and in which natural

infection is unknown; and (4) that group resembling in many respects the mosaics, but characterized by phloem necrosis.—The transmission, passage of the virus within the plant and properties of the virus are in turn briefly discussed.—Transmission may be by organic union, by insects, by inoculation with juices from infected plants, or more rarely through the seed. The phenomena of immunity and of "carriers" are exemplified among these diseases. There is much evidence that the virus is conveyed chiefly through the phloem. Plant pathologists were the first to have convicted insects of playing a primary role in natural infection of virus diseases, and they have proved that these diseases may be hereditary in both host plant and insect. They have also shown that the plant cuticle presents an impassable barrier to infection, that a saprophytic life of the causal organisms is highly improbable and that the latter are often so closely associated in some way with the living tissues that infection is only possible in some cases when organic union takes place between diseased and healthy tissues. Plant pathologists, finally, are demonstrating the remarkable effect of the environment, especially temperature, on the course of some of these maladies. Human pathologists, on the other hand, have done more to advance the study of the possible causative agents. [Cf. also: *Sci. Progress* 17: 416-431. 1923.]—*Frederick V. Rand.*

6570. EARLE, F. S. Mosaic disease danger. Prompt action needed to stop its spread in Cuba. *Facts about Sugar* 16: 230-231. 1923.—The mosaic disease of sugar cane is spreading rapidly in Cuba and very little is being done to control it. In Porto Rico, the disease is being controlled by seed selection and roguing.—*C. W. Edgerton.*

6571. MATZ, JULIUS. Naturaleza del mosaico de la caña. [Nature of cane mosaic.] *Sugar* 25: 222-223. 1923.—This is a discussion of the bodies found in the tissues of mosaic-affected plants.—*C. W. Edgerton.*

6572. MAUPAS, ALBERT. Sur la maladie de l'enroulement des feuilles de tomates. [Leaf roll disease of tomatoes.] *Rev. Hort.* 94: 52-54. 1922.—The cause of the disease is unknown. There is an accumulation of starch in the parenchymatous cells of the leaf, a lack of chlorophyll, and often a disintegration of the vessels of the leaf. Strains immune to the disease have been secured by planting seed of individual plants showing resistance.—*E. J. Kraus.*

6573. SEVERIN, HENRY H. P., WILLIAM J. HARTUNG, EDWARD A. SCHWING, AND WILLIAM W. THOMAS. Control of the beet leafhopper. *Facts about Sugar* 15: 134-135, 137. *Fig. 1-6.* 1922.—The leafhoppers and consequently the curly leaf disease of the sugar beet were decreased by dusting the plants with nicotine compounds. It is believed that the disease could be decreased to a considerable extent in isolated fields provided the dust is applied shortly after the spring flight of the hoppers into the cultivated fields.—*C. W. Edgerton.*

6574. VEVE, R. A. The efficiency of the "roguing" method for the eradication of the mottling disease. *Louisiana Planter* 69²: 30. 1922.—At Fajardo, Porto Rico, the mosaic of sugar cane has been reduced from 0.5 to 0.002 per cent by roguing. It is believed that good results can be obtained by this practice if the percentage of the disease is less than 15. [Cf. also: VEVE, R. A. *Cane Mottling Eradication. Facts about Sugar* 15: 78. 1922.]—*C. W. Edgerton.*

PARASITIC PHANEROGAMS

6575. SCHELLENBERG, GUSTAV. Eine sonderbare neue Wirtspflanze der *Lathraea Squamaria* L. [An unusual new host plant of *Lathraea Squamaria*.] *Ber. Deutsch. Bot. Ges.* 37: 427-429. 1919.—In the Botanical Garden of the University of Kiel a growth of *Lathraea* was found apparently parasitizing the beds of *Gunnera manicata* Linden and *G. chilensis* Lam. Investigation showed that *Lathraea* seed can germinate on *Gunnera chilensis* and are able to develop not only into seedlings but into much older plants with several branches. It was not formerly known that *Lathraea Squamaria* could grow on an herbaceous host plant and *Gunnera*

is especially noteworthy in this respect since it possesses especially fleshy roots. The previously known hosts of *Lathraea* are all woody plants without fleshy roots. The parasite is able to endure the relatively high tannin content of the *Gunnera* roots. Perhaps this large amount of tannin makes growth on *Gunnera* roots possible since *Lathraea* prefers as hosts plants with roots rich in tannin.—*Lillian C. Cash.*

NON-PARASITIC DISEASES

6576. BARTHOLOMEW, E. T. Internal decline of lemons II. Growth rate, water content, and acidity of lemons at different stages of maturity. *Amer. Jour. Bot.* 10: 117-126. 1923.—The size and growth rate of lemon fruits was determined by diameter measurements with a caliper, the acidity by the hydrogen electrode, and the water content by drying in a vacuum oven. The lemon tree tends toward the production of new fruit continuously, but the age of the tree and climatic and soil conditions make production more or less seasonal. Growth rate of fruit is determined by the time of year when set, the age of the tree, and various environmental conditions. Experiment shows that fruits may decrease considerably in size and in water content while still attached to the tree, in consequence of the withdrawal of water from them by the leaves. This may result in the collapse of a portion of the tissue at the styler end of the fruit, which is the first visible step in the production of internal decline. The wilting coefficient of the soil, as indicated by the leaves, cannot therefore be used to tell whether the fruits are suffering from lack of water. The water content of the 2 ends of a normal lemon is practically the same. As the lemon enlarges, its water content increases, although this increase is very small after the fruit reaches a diameter of about 3.8 cm. The size of the fruit is not necessarily proportional to the amount of water it contains. Mature lemons vary in water content, the range in these experiments being from 88.20 to 92.14 per cent. Total acid content increases rapidly as the fruit approaches maturity, but the true acidity increases very little after a diameter of 3.8 cm. is reached. Both ends of a normal lemon have approximately the same acidity. Mature lemons vary in acidity.—*E. W. Sinnott.*

6577. NEILSON, J. A. The winter injury problem. *Canadian Hort.* 44: 189-192. 1921.—The prevalence of winter injury on various fruits throughout the Province of Ontario is noted. Many forms of winter injury occur, ranging from complete killing of the tree to bud injury, and include root injury, sunscald, black heart, killing of bark on large and small limbs, killing of fruit spurs, fruit buds and terminal growth. Factors which predispose fruit trees to winter injury are noted and discussed together with preventive measures. These include temperature and winds, soil and cultural influences, heavy fruiting and stocks for propagation.—*E. F. Palmer.*

6578. PETIT, A. Un cas de chlorose guéri par le calcaire. [An instance of chlorosis eliminated by lime.] *Rev. Hort.* 94: 154-155. 1922.—Lime is effective against chlorosis caused by acidity of the soil, although an excess of lime causes chlorosis in certain plants particularly sensitive to it, such as some *Hydrangeas*, *Calceolarias*, *Rhododendrons*, and others.—*E. J. Kraus.*

DISEASES OF UNKNOWN CAUSE

6579. EARLE, F. S. Unknown cane disease found. *Facts about Sugar* 16: 383, 385. 1923.—The presence of an unknown cane disease is reported in Porto Rico. The disease first appears as small whitish water-soaked spots on the small leaves while they are still enrolled in the terminal bud spindle. On old leaves the very numerous spots are $\frac{1}{8}$ – $\frac{1}{4}$ inch wide and 1-2 inches long. The cause of the trouble was not determined, but the appearance suggested a bacterial origin.—*C. W. Edgerton.*

6580. LEE, H. A., C. G. WELLES, AND M. G. MEDALLA. Fiji disease in the Philippines. *Sugar* 24: 676-677. 1922. [See also *Bot. Absts.* 12, Entry 1317.]

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

6581. ANONYMOUS. A preliminary list of the diseases of cultivated plants in Ceylon. Dept. Agric. Ceylon Bull. 52. 24 p. 1922.—This is a compilation by members of the staff of the division of botany and mycology. The hosts are arranged alphabetically and under each the causative organisms of the various types of diseases are listed by their technical names under leaf, stem, and root diseases.—*E. D. Merrill.*

6582. ANONYMOUS. Summary of laws and regulations in force in Ceylon in respect of plant pests and diseases. Dept. Agric. Ceylon Bull. 48. 6 p. 1921.—A brief summary is given of the laws and regulations in force covering the importation, disinfecting of plants, destruction of plant pests, etc.—*E. D. Merrill.*

6583. ARNOLD, G. F. Uniformity of nursery stock fumigation requirements. Jour. Econ. Entomol. 16:161-166. 1923.—Recommendations for fumigating nursery stock in the different states vary considerably in the strength of hydrocyanic acid gas to use and the time of exposure necessary. The variations in temperature and humidity throughout the U. S. A. would not permit of standard fumigation regulations for the entire country. It would seem desirable for the states in each section (e.g., the Southern States) to adopt similar fumigation requirements for each kind of plant to be fumigated. Further experiments are suggested to determine the fumigation schedule that could be adopted in each group of states in the country.—*Author's abstract.*

6584. BALD, CLAUD. Indian tea: its culture and manufacture, being a text-book on the culture and manufacture of tea. 4th ed., viii + 397 p., 36 fig. Thacker, Spink and Co.: Calcutta, 1922.—Thirty-one pages of this work are devoted to a popular discussion of "tea blights" including insect and related pests, fungous diseases, and injuries by lichens and mosses, and by hail.—*Frederick V. Rand.*

6585. BALL, BERT. Seed potato treatment increases acre yield and profit. Seed World 11:15. 1 fig. 1922.—The author recommends hot formaldehyde solution.—*M. T. Munn.*

6586. BEATTIE, R. KENT. Important plant diseases collected on imported nursery stock in 1921 and 1922. Jour. Econ. Entomol. 16:146-151. 1923.—Quarantine 37 seeks to reduce the risk of importing foreign plant diseases and insect pests by limiting the entry of plants to those necessary and by surrounding such entry as is permitted with the safeguards of (1) freedom from soil, (2) importation in safest form, (3) inspection on entry, (4) disinfection, (5) field inspection, (6) port inspection of baggage and freight. A list of important plant diseases intercepted during the years 1921 and 1922 is appended.—*Author's abstract.*

6587. BROOKS, F. T. Disease resistance in plants. British Med. Jour. 1922: 964-966. 1922.—In man the parasites are chiefly bacteria and protozoa, in plants most pathological agents are fungi. In plants individual differences in reaction to disease are less pronounced but races of plants often show marked differences in susceptibility. As to the actual causes of disease resistance in plants little is known. Much so-called immunity is nothing more than disease escape. On the other hand the host does sometimes actively resist penetration by a parasitic fungus, as in certain rusts where the parasite attacks the host so feebly that haustoria cannot be established in the host cells and the fungus soon dies; in other cases the fungus may attack so vigorously that it surrounds itself with a barrier of dead cells which it cannot penetrate. These cases of immunity are purely local in effect and any antibodies found during the struggle are not transferred to other parts of the plant, there to confer immunity to subsequent attacks. With few exceptions parasitic attack in plants is relatively localized, the parasite only gradually enlarging its domain by progressive advancement.—On the other hand, fungi inhabiting the vascular system sometimes secrete toxic substances which, carried in the sap, cause death in distant tissues.—The environment is of particular

significance as regards the incidence of plant diseases.—In plant pathology high resistance rather than absolute immunity is usually concerned. Potato wart is one exception to this rule.—No examples are known where artificial immunity may be conferred on plants by inoculation with a weak strain of an otherwise virulent parasite.—Many plant diseases are due to wound parasites, the latter infecting only by way of dead cells. Although differences in susceptibility to diseases of this type may be just as marked as with obligate parasites like the rusts, the explanation of relative immunity is probably of a considerably different nature in the 2 categories.—*Frederick V. Rand.*

6588. EDGERTON, C. W. Rose diseases in Louisiana. Louisiana Agric. Exp. Sta. Extension Div. Cir. 63. 8 p., 3 fig. 1923.—The common rose diseases, mildew, leaf spots, crown gall, blossom blight and canker, are briefly described and directions given for their control.—*C. W. Edgerton.*

6589. GADD, C. H. Nut fall of coconuts. Dept. Agric. Ceylon Bull. 53. 18 p., 3 fig. 1922.—Very young immature nuts fall as a consequence of an excess of female flowers, sometimes influenced by drought conditions. The fall of older nuts may be caused by the attack of *Phytophthora* sp., or may be caused by mechanical or physiological factors. Bordeaux mixture spray is recommended as a preventive of nut fall caused by fungus attack.—*E. D. Merrill.*

6590. GADD, C. H. The efficacy of formaldehyde vapour as a disinfectant of tea seed. Dept. Agric. Ceylon Bull. 51. 8 p. 1921.—The method of disinfection at Colombo is economically unsound, and it does not prove an adequate safeguard against the introduction of fungus pests with tea seed.—*E. D. Merrill.*

6591. GRAM, ERNST, OG SOFIE ROSTRUP. Oversigt over Sygdomme hos Landbrugets og Havebrugets Kulturplanter i 1922. [Review of diseases of cultivated plants, 1922.] Tidsskr. Planteavl 29: 236–307. 1923.—This report covers the period from Oct. 1, 1921 to Sept. 30, 1922. The weather was dry during the fall, exceptionally cold during the winter, the spring was late and the summer cool and moist. The following were reported: *Pleospora graminea* was serious in a few cases on barley; *Tilletia caries* is decreasing because of seed treatment; *Ustilago Hordei*, *U. Avenae*, and *Urocystis occulta* have increased; *Heterodera Schachtii* var. *Avenae* was most destructive where oats were grown too frequently; larvae of *Oscinis frit* and *Chlorops taeniopus* were disastrous in Jutland; larvae of *Hylemyia coarctata* attacked wheat after several inactive seasons; *Agriotes lineatus* larvae infected summer and winter grain; *Biston zonarius* larvae devoured an alfalfa field; *Hypochnus Solani* was severe; *Sclerotinia sclerotiorum*, *Ascochyta Pisi*, and *Macrosiphum Pisi* were common on legumes; *Trioza viridula* occurred in Jutland; potato leaf roll, mosaic, and other virus diseases have greatly increased due to hot, dry weather; *Apanea testacea* larvae ruined meadow fescue; *Fusarium Willkommii* (conidial form of *Nectria galligena*) caused storage rot in apples and pears; *Xyloterus dispar* injury on fruit trees was reported for the first time in Denmark; *Hoplocampa testudinea* and *H. fulvicornis* were numerous on apples, pears and plums; *Marsonia Potentillae* var. *Fragariae* was reported for the first time causing strawberry leaf spot; *Anthonomus Rubi* caused severe injury in strawberries; *Acalla comariana* larvae were serious on strawberries; *Phyllotreta nemorum* and other flea beetles made rescuing necessary in many cases; *Meligethes aeneus* spoiled seed crops of swedes and other crucifers; *Phyllotreta cucurbitacearum* occurred in leaf-spots on muskmelons; *Heterosporium Allii* appeared on leeks. Frost injury was bad on some varieties of wheat when late sown and on fruits and ornamentals; salt water injury was caused by heavy storms; spray injury occurred on apples and roses due to 2 per cent Burgundy mixture with 0.05 per cent Schweinfurther green, and on pears due to formalin; a tobacco extract containing free ammonia caused complete defoliation. *Phytophthora infestans* was successfully controlled with 2 per cent Bordeaux mixture on tomato fruits; *Cladosporium fulvum* in greenhouses was controlled by ventilation and night heating, and a 1:40 lime sulphur spray was better than 2 per cent Bordeaux mixture. The migration of *Aphis Fitchii* to grass roots

was demonstrated; the larvae of *Chortophila brassicae* were controlled experimentally with tar paper discs and with 2 waterings with a 0.1 per cent solution of corrosive sublimate; numerous experiments proved that beet mosaic was not carried by seed, and the newly hatched larvae of *Nematus ribesii* were destroyed by tobacco extract spray.—*Albert A. Hansen.*

6592. HAUDUROY, PAUL. Atlas de parasitologie. [Atlas of parasitology.] 53 p., 25 pl. O. Doin: Paris, 1923.—This "atlas" comprises a set of plates each with a descriptive page, systematically arranged, figuring and briefly describing the parasites of man and animals, beginning with amoebae, flagellates and spirochaetes, including the other parasites of animal affinities, and ending with fungus parasites.—*Frederick V. Rand.*

6593. LANG, WILLIAM H. II. Some aspects of vegetable pathology in relation to human disease. British Med. Jour. 1922: 958-961. 1922.—The common features of all living things justify the attempt at comparisons between pathological processes in plants and animals but it is well to maintain a critical rather than an optimistic attitude.—Comparison is made between pathological reactions in certain fossil Devonian plants and intumescences and wound-calluses of today. It seems obvious to the author that a general correspondence can be traced between the healing of a wound in the plant vs. the animal body, but that more specific comparisons would only lead astray.—Crown gall (*Bacterium tumefaciens* Sm. & Town.), especially as set forth in the researches of Erwin F. Smith, is discussed in some detail, with references also to plant galls of animal causation and to several other diseases of fungus and bacterial origin. There is no doubt that the resemblances between sections of some of the tumor-like growths of crown gall and of animal tumors are striking and may well interest the human pathologist. The author, however, does not accept on the evidence before him all the direct comparisons with malignant tumors in animals nor does he think it wise to draw conclusions as to the etiology of the latter from the undoubted facts as to *B. tumefaciens* being the cause of crown gall. The conception of embryomatous tumors in animals involves the early distinction of germinal layers and of somatic and reproductive cells; there is no strict parallel to this, he says, in plants. The question of actual intrusion, as distinguished from extension of the morbid process to adjoining cells, requires critical reinvestigation.—It is of interest to note that Erwin F. Smith's studies of crown gall have led him to consider and experimentally attack such general underlying problems as the tracing of pathological processes back to changes in the cells and their protoplasm, and as such work is more and more carried out fundamental common features of disease in plants and animals will become increasingly evident. To the philosophical human pathologist the study of some plant diseases will be light-giving, and it is perhaps better not to expect it to be fruit-giving.—*Frederick V. Rand.*

6594. NORTH, D. S. The control of sugar cane diseases. Pt. I.—(Continued.) II. The nature of our diseases and the means for their control. Australian Sugar Jour. 15: 9-24. 1923.—All the more important Australian cane diseases have been imported with cane and can be propagated by diseased cuttings. The diseases discussed are grouped into 3 types. Type 1. Gumming, leaf scald, leaf stripe, Fiji disease, and mosaic will always produce diseased plants from a diseased set. The diseased plant is highly infectious. There may be alternate hosts, but they have not been traced. Control is by careful selection of healthy seed, eradication of diseased cane, and use of resistant varieties.—Type 2. Red rot, root fungus disease (*Marasmius* type) and the Sclerotial diseases of the leaf sheaths are caused by weak facultative parasites. They live on decaying cane which is attacked only when enfeebled. Healthy cane can be propagated from infected plants. Control is by judicious rotation of crops, cultivation, and use of resistant varieties.—Type 3. Leaf spots such as true rust, eye spot, and ring spot are caused by strict parasites. They are conspicuous but not especially harmful diseases and appear and disappear at particular seasons. Control is by the use of resistant varieties.—Part II. To prevent spreading disease with different varieties of cane safeguards are suggested. Those endorsed in one part of Australia are: (1) every precaution practicable should be taken at the forwarding end that healthy plants are selected for sending; (2) every imported cane should be grown in strict quarantine until its health is assured. Foreign im-

portations should be limited to a few varieties at intervals of years. Only varieties of outstanding promise should be imported. No cane plants should be sent from state to state or mill to mill within Australia except under supervision. Quarantine might be waived only in case of neighboring mills where similar conditions exist, same diseases occur and same standard varieties are grown. Within a mill district bulk transportation of cane should be discouraged except under technical supervision. (3) New varieties should be obtained by raising seedlings rather than importing from abroad. Only seedlings of highest promise should be exchanged with other centers. The exclusion of all foreign canes, at least temporarily, should be considered, but first a general agreement as to quarantine measures should be reached. A quarantine system is now used in 1 region for the introduction of canes from Fiji and New Guinea. A few cane plants are grown in gardens of private residences near Sidney. These gardens are about 1 mile apart. Although so far south of the tropical cane areas, the plants grow satisfactorily when cared for. Monthly inspections for 2 years are made for the presence of diseases or pests.—*C. Rumbold*.

6595. SORAUER, PAUL. *Handbuch der Pflanzenkrankheiten begründet von Paul Sorauer*. 4th ed. Edited by G. LINDAU in cooperation with E. KÖHLER, R. LAUBERT, W. WOLLENWEBER, AND H. ZILLIG. Vol. 3. *Die pflanzlichen Parasiten*. Pt. 2. [Handbook of plant diseases founded by Paul Sorauer. Diseases caused by vegetable parasites.] vi + 310 p., 55 fig. Paul Parey: Berlin, 1923.—This volume continues the discussion of parasitic fungi begun in volume 2, part 1, and under this heading includes the Basidiomycetes and Fungi Imperfecti, with a special chapter on the genus *Fusarium* by H. W. Wollenweber. This is followed by sections on parasitic algae, lichens, phanerogamic parasites; and a final section on prevention and control of fungous diseases of plants, a special chapter on the smuts, by H. Zillig, and a supplement to the Hypodermataceae.—Treatment of the subject includes general descriptions and discussions of the major groups with keys to the principal genera, and descriptions and discussions of genera and species. [See also Bot. Absts. 12, Entries 2050, 2051.]—*Frederick V. Rand*.

6596. STEARNS, L. A., AND W. S. HOUGH. *Spreader tests on apples and peaches*. Jour. Econ. Entomol. 16: 198-207. 1923.—Casein and flour-paste have received considerable attention for some time as spreaders and adhesives in spray solutions. In 1922, orchard tests were conducted with Kayso, a prepared casein spreader, and Magnet Dry Paste, a prepared flour-paste spreader to determine their effectiveness as influencing the spreading and adherence of the summer applications in the scheduled programs for apple and peach spraying in Virginia.—Neither of the spreaders used increased the effectiveness of the spray solution in protecting the fruit from insects and diseases. The same was true in case of the foliage. It is doubtful whether the addition of a spreader, such as the 2 used, would pay for the increased cost of the spray. Nicotine sulphate 40 per cent (Black Leaf 40) and casein (Kayso) as used, were uncongenial.—*Authors' abstract*.

6597. TAUBENHAUS, J. J. *The culture and diseases of the sweet potato*. xv + 286 p., 29 fig. E. P. Dutton and Co: New York, 1923.—Of this comprehensive work on the sweet potato 75 pages are devoted to its diseases. The discussion under this head includes the morphology of the healthy host, losses from sweet potato diseases, specific diseases, insects, and other pests. Under "Specific diseases" some 25 or more sweet potato maladies are discussed as to kind and amount of injury, causal organism if any, control, and other special points of interest relative to particular diseases.—*Frederick V. Rand*.

6598. [TAYLOR, E. H.] *Cane diseases in the Philippines*. Sugar 24: 504-505. 1922.—This is a brief account of the Fiji disease and the Formosa leaf-stripe disease of sugar cane, 2 diseases introduced into the Philippines within the preceding 10 years.—*C. W. Edgerton*.

6599. WHETZEL, H. H. *Dusting in Bermuda*. Agric. Bull. Bermuda Dept. Agric. 2⁵: 9-10. 1923.—Observations and suggestions are presented on the status of dusting in the Islands with directions and suggestions for its more effective application.—*H. H. Whetzel*.

6600. WHETZEL, H. H. The plant disease situation. [Special report on plant diseases in Bermuda.] Agric. Bull. Bermuda Dept. Agric. 2⁵: 2-9. 1923.—A report on diseases and pests was presented to the Director and Board of Agriculture following a 10-days' visit to the Islands during April, 1923. The epiphytotic of onion blight caused by *Peronospora schlei-deniana* is briefly presented. A loss of about 75 per cent of the crop is predicted. Late blight of the potato is reported as severe in the Garnet crop due to the cool rainy season. Snapdragon rust, caused by *Puccinia Anterrhina*, first observed in Bermuda in 1922 has swept the Islands, practically ruining this ornamental plant and promising to make the growing of snapdragons there impossible in the future. The oleander scale (*Aulicaspis pentagona*), so destructive during the past 2 or 3 years, is rapidly being brought under control by imported parasites. Celery blight (*Septoria petroselinia*) and onion pink rot (*Fusarium Mali*) were less severe than in 1922. Remarkable progress in development of dusting in the Islands is reported.—H. H. Whetzel.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 6213, 6300, 6491, 6624, 6647, 6733)

6601. ANONYMOUS. The cultivation of medicinal plants in France. Amer. Druggist and Pharm. Rec. 71: 11-14. 6 fig. 1923.—The author describes the organization of the Committee of Medicinal Plants, which was necessary because of the failure of supplies from Germany and Austria; the conditions under which collection and marketing wild plants is profitable, and the cultivation of plants which cannot be supplied by other means.—C. M. Sterling.

6602. BLOKZEYL, K. R. F. Essential oil production in Java. Pharm. Era 56: 667-670, 694. 5 fig. 1923.—An account is given of the sources, collection of plants, and distillation of oils of Citronella, Lemongrass, Cananga, Vetivert, Patchouli, and Cajuput.—C. M. Sterling.

6603. GORTER, K. Sur la laurotétanine, l'alcadoïde tétanisant de diverses Lauracées. [On the constituents of laurel—the alkaloidal content of various Lauraceae.] Bull. Jard. Bot. Buitenzorg III, 3: 180-198. 1921.

6604. JONESSON, A. The most widely used crude drug. Pharm. Era 56: 607-608. 4 fig. 1923.—The author gives a history of the varieties of senna, their collection, marketing, and uses.—C. M. Sterling.

6605. KOCH, F. J. The whence of the lavender. Amer. Druggist and Pharm. Rec. 71: 20-21. 2 fig. 1923.—A brief account is presented of the habitat, collection, and preparation of lavender.—C. M. Sterling.

6606. KRITIKER, D. B. Some important drugs of India, their chemical constituents, therapeutics and native uses. Amer. Druggist and Pharm. Rec. 71: 20-22. 1923.—A description is given of the most important drugs derived from India, giving the habitat and methods of preparation as well as the chemical constituents and therapeutic uses of Indian Hemp, Sandalwood, Myristica, Mace, Podophyllum, Nux Vomica, Pomegranate, Turmeric, Catechu, and Opium.—C. M. Sterling.

6607. MOLL, J. W., AND H. H. JANSSONIUS. Botanical pen-portraits. viii + 472 p., 111 fig. Martinus Nijhoff: The Hague, 1923.—The authors have attempted for micrography what has been so well done in phytography. The work attempts to give so accurate and so complete a description of the microscopic structure of the plant or part of the plant (the authors have selected for their study the description of 100 vegetable drugs), that a drawing is not

needed. A pen-portrait gives more than any drawing, for the latter can represent only a single individual and therefore but one aspect of the object. The pen-portrait not only combined the descriptions of sections in various directions into a perspective description, and thus portrays the tissues as bodies with 3 dimensions, but can also combine the descriptions of several individuals, so that a knowledge of "habit" of that particular object is acquired. In order to do this, 21 "guiding schemes" for the descriptions have been constructed, each calling critical attention to what ought to be observed. For example, in the Guiding Scheme for the Description of the Leaf, more than 150 points are stressed; even in the Guiding Scheme for the Description of a Stamen attention is called to more than 150 points. In nearly all cases the authors, after giving the Latin and English official names, and the part official, describe the (1) "macroscopic characters," a scheme for which is also included among the list of schemes; (2) "anatomical characters," under which caption appears a fairly exhaustive literature on the drug, a remark on the nature of the material used,—whether fresh or dry, if fresh, how fixed, etc., and the list of reagents used; (3) "micrography," the main portion of the work; (4) "micrography of the powder," given in only part of the cases. A carefully arranged list of literature on the subject, a complete list of the chemicals and reagents used, and a glossary of the anatomical terms used, add to the value of the work. Following is a list of the drugs described, 60 of which are in the U. S. Pharmacopoeia: *Amylum Manihot*, *Amylum Marantae*, *Amylum Maidis*, *Amylum Oryzae*, *Amylum Tritici*, *Bulbus Scillae*, *Carrageen*, *Caryophylli*, *Cortex Alyxiae*, *Cortex Cinnamoni*, *Cortex Condurango*, *Cortex Cuspariae*, *Cortex Fructus Aurantii*, *Cortex Granati*, *Cortex Hamamelidis*, *Cortex Mezerei*, *Cortex Pruni virginianae*, *Cortex Quillariae*, *Cortex Rhamni Frangulae*, *Cortex Rhamni Purshianae*, *Cortex Syzygii*, *Cortex Viburni prunifolii*, *Flores Arnicae*, *Flores Chamomillae vulgaris*, *Flores Cinae*, *Flores Tiliae*, *Folia Althaeae*, *Folia Buchu*, *Folia Cocae*, *Folia Digitalis*, *Folia Eucalypti*, *Folia Jaborandi*, *Folia Laurocerasi*, *Folia Menthae piperitae*, *Folia Salviae*, *Folia Sennae*, *Folia Stramonii*, *Folia Taraxaci*, *Folia Trifolii fibrini*, *Folia Uvae Ursi*, *Fructus Anethi*, *Fructus Anisi*, *Fructus Carui*, *Fructus Colocynthis*, *Fructus Conii*, *Fructus Coriandri*, *Fructus Cubebae*, *Fructus Foeniculi*, *Fructus Pimentae*, *Fructus Piperis nigri*, *Fructus Sambuci recentes*, *Gallae*, *Glandulae Lupuli*, *Herba Absinthii*, *Herba Aconiti recens*, *Herba Belladonnae recens*, *Herba Cannabis indicae*, *Herba Cardui benedicti*, *Herba Centaurii*, *Herba Conii*, *Herba Hyoscyami*, *Herba Sabinae*, *Lichen islandicus*, *Lignum Guaiaci*, *Lignum Quassiae*, *Lignum Santalinum*, *Lycopodium*, *Petala Rhoeados Petala Rosae gallicae*, *Radix Aconiti*, *Radix Althaeae*, *Radix Armoraciae*, *Radix Belladonnae*, *Radix Helenii*, *Radix Jalapae*, *Radix Liquiritiae*, *Radix Pyrethri*, *Radix Sarsa parillae*, *Radix Taraxaci*, *Radix Valerianae*, *Rhizoma Arnicae*, *Rhizoma Calami*, *Rhizoma Filicis*, *Rhizoma Hydrastis*, *Rhizoma Podophylli*, *Rhizoma Zingiberis*, *Secale cornutum*, *Semen Amygdalae dulcis*, *Semen Amygdalae amarae*, *Semen Cardamomi*, *Semen Colchici*, *Semen Lini*, *Semen Myristicae*, *Semen Physostigmatis*, *Semen Sinapis albae*, *Semen Sinapis*, *Semen Stramonii*, *Semen Strychni*, *Stigmata Croci*.—*C. C. Platt*.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

WILLIAM J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 6146, 6147, 6154, 6155, 6156, 6159, 6176, 6186, 6190, 6196, 6200, 6212, 6227, 6230, 6243, 6244, 6245, 6247, 6248, 6281, 6316, 6358, 6379, 6387, 6388, 6447, 6454, 6458, 6476, 6508, 6509, 6524, 6565, 6576, 6578, 6694, 6727, 6734)

GENERAL

6608. FALK, I. S. The role of certain ions in bacterial physiology. *Absts. Bact.* 7: 33-50, 87-105, 133-147. 1923.—This is a review of the literature to Sept., 1922, and partially revised to Feb. 1, 1923. The following chapters are included: cations in general physiology; inorganic content of the bacteria; cations in synthetic media; cations in growth, viability, and disin-

fection; cations in soils, ammonification, nitrification, nitrogen fixation; cations in permeability; cations in immunity reactions; theory of ion action; bibliography (p. 133-147).—*D. Reddick.*

DIFFUSION, PHYSICO-CHEMICAL PHENOMENA

6609. ADDOMS, RUTH M. The effect of the hydrogen ion on the protoplasm of the root hairs of wheat. *Amer. Jour. Bot.* 10: 211-220. 1 pl. 1923.—Wheat seedlings were grown in 5 nutrient solutions selected from Shive's "optimal" group, in all of which the osmotic concentration (1.75 atmospheres) and the lime-magnesium ratio were essentially constant. The H-ion concentration varied from pH 3.94 to pH 3.47 owing to differences in the amount of KH_2PO_4 used. In those solutions in which the H-ion concentration was high, the root systems were abnormal in being short, stubby, and much branched. In the root-hairs of such roots, when studied under the dark-field microscope, the protoplasm was found to be coagulated and flocculated as compared with its normal condition in other roots. The relation of this effect to the colloid chemistry of protoplasm is discussed. The author suggests that the injurious influence of high H-ion concentration is due to the fact that it renders the root-hairs ineffective as absorbing organs, and she believes that a direct relation between the H-ion concentration of a nutrient solution and any single plant character, such as yield, consequently cannot exist.—*E. W. Sinnott.*

6610. HOFLER, KARL. Über den zeitlichen Verlauf der Plasmadurchlässigkeit in Salzlösungen I. [The speed of plasma penetrability in salt solutions.] *Ber. Deutsch. Bot. Ges.* 37: 314-326. 1919.—The author investigated the length of time for the protoplast to take up salt solutions, using cells of *Tradescantia elongata* and a technique described in an earlier paper [*Ber. Deutsch. Bot. Ges.* 36: 414. 1918.] Cane sugar and KNO_3 were the substances used, both in hypertonic solutions. When the protoplast, after a 2-hour plasmolysis, reaches its final form and the direct measurement can be made, the permeability is still normal. Similar cells behave very differently. Even the same cell can, in consecutive experiments, take up varying amounts of KNO_3 . The clearest line of behavior is the very gradual increase of permeability in the hours before death. Furthermore there are demonstrated unknown reversible variations in permeability in the living protoplast, which are very different in single cases and which can not be caused by direct reaction from outside stimuli.—*S. F. Cook.*

6611. HOFLER, K., UND A. STIEGLER. Ein auffälliger Permeabilitätsversuch in Harnstofflösung. [A striking experiment in permeability with a urea solution.] *Ber. Deutsch. Bot. Ges.* 39: 157-164. 1921.—Experiments were performed, using the epidermal cells of the stem of *Gentiana Sturmiiana* and following the plasmometric method. It was found that urea penetrated in great quantities and quite rapidly, as shown by the fact that the protoplasm shrank for a few minutes and then very quickly returned to its normal position. The amount of penetration was 30-60 times as much as has been observed in the case of other plants (*Rhoeo*, *Tradescantia*, *Allium*). It was found that the permeability of the cells to urea was 170 times greater than the permeability to KNO_3 . Furthermore, only the stem epidermal cells could be made to show this unusual permeability to urea, and the authors state that this is the 1st surely proved case of a differential permeability of the plasma of different tissues of the same plant.—*S. F. Cook.*

6612. QUIRK, AGNES, J., AND EDNA H. FAWCETT. With introduction by ERWIN F. SMITH. Hydrogen-ion concentration vs. titratable acidity in culture mediums. *Jour. Infect. Diseases* 33: 1-59. Pl. 1 (col.), fig. 1-10. 1923.—Extensive experiments are reported with regard to measuring and adjusting the reaction of beef infusion media. The titrimetric and H-ion methods of determining acidity and alkalinity are compared. The color "faint but distinct, pink" by phenolphthalein was found to be pH 8.2 and was called the zero of the Fuller's scale. The 1st change in color occurred at pH 7.8. At the rose pink color the pH was 8.4. Formulae are given for converting pH readings to Fuller's scale and for obtaining the pH having given the Fuller's scale titration readings. Experiments were conducted to determine the effects

of dilution in preparing beef broth, the variations in media prepared from different samples of the same portion of beef, and the variations between broths from different cuts of beef with and without dilution. It was found that average pH values varied in the same direction as the average titration values. Fuller's scale values were readily transferable to pH values. Media having graded additions of acid and alkali showed buffer effects causing the reaction to vary from the theoretical. The reaction by the Fuller's scale and pH followed one another closely, but did not coincide. The reaction became more acid in the media upon standing. The hot infusion had a slightly greater buffer effect than the cold. These 2 varied appreciably only at the extreme ranges. The Fuller's scale and pH reactions of beef extract broths having graded additions of alkali did not coincide as they did in beef infusions. Gelatin increased the buffer content of beef infusion while agar exerted no appreciable effect.—The authors conclude that the titration method of determining the reaction of media based on peptone beef infusion is not illogical and unusable as Clark and others have claimed. In general, titrametric methods were believed to be fully as desirable as the colorimetric determination of the H-ions for obtaining the reaction of beef infusion media within the limits of +30 and -10 Fuller's scale, corresponding to pH 5.2 and 9.2 respectively. Of a considerable number of plant pathogens studied most of them exhibited growth limits within these ranges.—*R. L. Starkey.*

6613. SCHAEDE, REINHOLD. Über das Verhalten von Pflanzenzellen gegenüber Anilinfarbstoffen. [The behavior of plant cells toward anilin dyes.] *Jahrb. Wiss. Bot.* 62: 65-91. 1923.—The author made a study of dye penetration into the root hairs of *Hydrocharis morsus ranae*. Great care was exercised to use fresh material and protoplasmic streaming was taken as a criterion of the normal condition of the cell. The following dyes were used: chrysoidin, Bismark brown, methyl violet, gentian violet, methylene blue (in distilled and tap water), neutral red, safranin, acid fuchsin (in distilled and tap water). Chrysoidin was the only dye which penetrated uninjured plasma. There was coloration with Bismark brown and gentian violet after injury to the cell. No case of nuclear staining, *intra vitam*, was observed. Methyl violet and gentian violet penetrated the microsomes but this is connected with the toxic effect of the dyes. A precipitate of doubtful nature was caused in the cell sap by methyl violet, gentian violet, and safranin. The author points out the correlation between the acidity or basicity of the dye and the cell as determined by the penetration of the dyes. The cytoplasm is basic when alive and acid when dead. The microsomes are probably acid and the cell sap neutral.—*S. F. Cook.*

6614. STERN, KURT. Über negative Osmosen und verwandte Erscheinungen. [Negative osmosis and related phenomena.] *Ber. Deutsch. Bot. Ges.* 37: 334-343. 1919.—The scheme of the processes taking place on semipermeable precipitation membranes and the theory of osmotic pressure have until recently served to explain the passage of liquids through plant cell membranes. The author considers the question of the limitation of this method and its correct application. After a critical review of the work on electro-endosmosis from Dutrochet and Graham to the present time he concludes that if at present no definite proof of the presence of negative osmosis in plant protoplasm has been discovered, nevertheless, in view of the physical and physiological evidence, it must be regarded as very probable. *S. F. Cook.*

6615. WEBER, FRIEDL. Die Zellsaftviscosität lebender Pflanzenzellen. [The cell sap viscosity of living plant cells.] *Ber. Deutsch. Bot. Ges.* 39: 188-193. 1921.—The author uses the time in which calcium oxalate crystals fall through the sap of cells of *Callisia repens* as a criterion of the viscosity of the sap, applying the formula of Stoke's law: $V = \frac{2}{9} \frac{D-d}{n} gr^2$. He finds that the viscosity is about 2 times that of water, and that it decreases with a rise of temperature with a coefficient of from 1.13 to 1.19.—*S. F. Cook.*

WATER RELATIONS

6616. BODE, HANS ROBERT. *Beiträge zur Dynamik der Wasserbewegung in den Gefäßpflanzen.* [Contribution to the dynamics of the movement of water in the vascular plants.] *Jahrb. Wiss. Bot.* 62: 92-127. 1923.—The author made a large number of observations and experiments, using several methods of technique, on the following plants: *Impatiens Sultani*, *Tradescantia zebrina*, *Elatostemma sessile*, *Cucurbita Pepo*, *Syringa vulgaris*, *Lycium halimifolium*, *Taxus baccata*, *Ginkgo biloba*, *Phaseolus*, *Sambucus*, and *Helianthus annuus*. Direct microscopic examination of the vessels of wilted plants, under the most unfavorable conditions of water conduction, showed that the continuity of the water columns in the vessels was unbroken. The presence of a cohesion tension is shown by wounding the vessels under mercury, which is taken into the vessel in direct contact with the water, and it is made clear that it is impossible for the gas, dissolved in the water, to separate as bubbles. Such bubbles, found by the older workers, were due to faulty technique. The diameter of the vessels of herbaceous plants was observed to shrink, under unfavorable conditions, this being due to the cohesion tension of the water columns. In both the stem and root the filtration resistance shows a complete proportionality with the difference in pressure.—*S. F. Cook.*

MINERAL NUTRIENTS AND SALT RELATIONS

6617. HOFFER, G. N., and R. H. CARR. *Accumulation of aluminum and iron compounds in corn plants in its probable relation to rootrots.* *Jour. Agric. Res.* 23: 801-823. *Pl. I (col.)*-21. 1923.—A disintegration of tissue in the nodal plate of maize occurs in the absence of specific organisms. These regions show an excessive amount of iron or aluminum compounds or both. Brown, yellowish brown, and brownish purple lesions similar to those in diseased plants have been produced by injecting solutions of certain salts of aluminum and iron into the plants. A definite cumulative toxicity of aluminum salts was established by the injection experiments and the same phenomenon is believed to occur naturally in the field. The most severe cases of rootrot are found in soils deficient in lime and available phosphates but with variable quantities of salts of aluminum and iron available for absorption. Such organisms as *Fusarium moniliforme*, *Gibberella Saubinetii*, etc., are thought to be ubiquitous and under favorable conditions attack plants which are already weakened by the accumulation of toxic salts. Those plants which show the largest accumulation of iron and aluminum are the ones which develop the most severe cases of rootrot.—“The application of lime and phosphates to soils in which rootrots have developed in destructive proportions has been decidedly beneficial in controlling them. The use of limestone alone in some instances proved harmful, but in all cases studied the application of available phosphates produced plants which were better and more resistant to the rootrots.”—*D. Reddick.*

6618. TOTTINGHAM, W. E., and E. J. RANKIN. *The availability of iron in nutrient solutions for wheat.* *Amer. Jour. Bot.* 10: 203-210. 4 fig. 1923.—The solubility of ferric citrate, phosphate, and sulphate, and of ferrous sulphate, were determined at pH 4.2 and pH 6.0 of the Livingston-Tottingham nutrient solution. Ferric phosphate is relatively insoluble, and ferric and ferrous sulphate are so in solutions which approach neutrality. Ferric citrate is not very soluble but its solubility is maintained over a considerable range of pH values. The H-ion concentration is increased by ferric sulphate, decreased by ferric citrate, and affected little by the others. Young wheat plants showed much better growth in ferric citrate than in any other form of iron, the unfavorable effect of the others being presumably due to low solubility or to modification of the H-ion concentration.—*E. W. Sinnott.*

PHOTOSYNTHESIS, CHLOROPHYLL

6619. WLODEK, JEAN. *Recherches sur l'influence des engrais chimiques sur le coefficient chlorophyllien.* [The influence of chemical fertilizers on the chlorophyll coefficient.] *Bull. Acad. Polonaise Sci. et Lettres Classe Sci. Math. et Nat., Ser. B.* 1920: 19-52. 1922.—Determinations were made of the chlorophyll coefficient, neochlorophyll (A): allochlorophyll

(*B*) (Willstaetter's Chlorophyll *a* and *b*) by comparing the limits of the absorption bands by means of a Wagner spectrometer (Zeitschr. Instrumentenk. 1913, p. 149). The living leaves of potato and sugar-beet were studied, grown in soils to which various fertilizers were added: (1) without fertilizer; (2) P, K, and N; (3) P and N, but no K; (4) P, N, Mg, no K; (5) K, N, no P; (6) P, K, no N. It is concluded that after a certain period of development of the plants the relation of the chlorophyll pigments varies during the course of 24 hours; *B* increases during the day and *A* during the night. The lack of K results in an absolute and relative diminution of *B* and an increase in *A*, as well as a reduction of the daily variation of the 2 components. Lack of P also reduces the daily variation of the chlorophyll components and narrows the absorption bands; N tends to reduce *A* and augment *B*. The action of Ca and Mg is not definitely established.—*H. A. Spoehr*.

6620. WLODEK, JEAN. *Recherches sur l'influence de la lumière et des engrais chimiques sur le coefficient chlorophyllien.* [The influence of light and of chemical fertilizers on the chlorophyll coefficient.] Bull. Acad. Polonaise Sci. et Lettres Classe Sci. Math. et Nat., Ser. B. 1921: 143-190. 1922.—I. Using the same methods as in the foregoing paper [see preceding entry] Wlodek has studied the variations of the chlorophyll coefficient in *Iris germanica* under the influence of light, with attached and excised leaves. During illumination the absorption bands shift toward the more refrangible portion of the spectrum and in the opposite direction in the dark. In illuminated leaves the absorption band of allochlorophyll becomes wider, that of neochlorophyll narrower, while the reverse happens in the dark. This change does not take place instantaneously, requiring $\frac{1}{2}$ -2 hours. The shifting of the absorption band is noticeable after 15 minutes. Leaves which have died through wilting show an increased chlorophyll coefficient and a shifting of the absorption band towards the violet. Ether diminishes the variations in the chlorophyll coefficient.—II. In endeavoring to relate the chlorophyll coefficient to mineral nutrients of oats, barley, and beans, it was found that with a lack of K the coefficient diminishes at a certain phase of development of the plants. This is due to an increase of the absorption band of neochlorophyll and a decrease in that of allochlorophyll, as compared with plants grown under normal conditions. A lack of N in the soil increases the chlorophyll coefficient. A relation seems to exist between the width of the first absorption band and the nitrogen content in fresh bean leaves, in the straw and harvest of oats and barley. The nitrogen content increases with the width of the band. With a lack of K the chlorophyll coefficient does not change under the influence of light and darkness. In leaves which show an abnormal chlorophyll coefficient the production of vegetative material is less.—*H. A. Spoehr*.

METABOLISM (GENERAL)

6621. BERGMANN, MAX. The structure of sucrose. Jour. Chem. Soc. [London] 123: 1277-1279. 1923.

6622. BROWN, ELMER B., AND TREAT B. JOHNSON. The sugar found in tuberculinic acid, the nucleic acid of the tubercle bacillus. Jour. Amer. Chem. Soc. 45: 1823-1827. 1923.—In a former paper the authors found that this nucleic acid contained the pyrimidines, thymine and cytosine, but no uracil. In this paper they report the observation that the sugar making up the carbohydrate of this nucleic acid is a hexose rather than a pentose. From their findings it seems that the nucleic acid of the bacillus of tuberculosis resembles the nucleic acid of the animal rather than that of the plant. A complete description of the chemical methods used in this work is given.—*J. M. Brannon*.

6623. BRUNSWIK, HERMANN. Über Hesperidinsphärite im lebenden Hautgewebe von *Anthurium Binotii* Linden. [Hesperidin sphaerocrystals in living cells of *Anthurium Binotis*.] Ber. Deutsch. Bot. Ges. 39: 209-213. 1921.—Hesperidin, a rhamnoside glucoside, has been found in a monocotyledon, *Anthurium Binoti* Linden, and in crystalline form. Both are rare occurrences, since it had previously been reported in 24 dicotyledonous families, but in only 2 monocotyledonous families and always in solution in the cell sap.—The chemical reactions

and solubilities of the crystals are described. They are the usual tests for hesperidin.—Twelve other species of *Anthurium* were examined for hesperidin but none was found.—*S. H. Eckerson.*

6624. DOBBIN, LEONARD. On the presence of formic acid in the stinging hairs of the nettle. *Proc. Roy. Soc. Edinburgh* 39:137-142. 1919.—The experimental evidence upon which the textbook statements regarding the presence of formic acid in the stinging hairs of the common nettles, *Urtica dioica* or *U. urens*, are based is regarded as inadequate in the light of present-day knowledge. The author collected the exudate from the hairs by applying to the leaves strips of the very best filter paper impregnated with barium carbonate. This fixed the free acid of hairs without contamination from the protoplasmic contents of the cells. The paper was then tested for the presence of barium formate. This was done by extraction with cold water, filtering, mixing with phosphoric acid, and distilling. The distillate was mixed with lead or barium hydroxides, filtered, saturated with carbon dioxide, and evaporated to dryness on a steam bath. The residue was extracted with hot water and filtered. The filtrate was placed in small drops on glass slides and evaporated over sulphuric acid. These were examined with the polarizing microscope and found to show (a) "stellate groupings of strongly bi-refracting needles and (b) single crystals with well developed faces and sharp edges," both of which behave optically as lead formate. Slides from solutions in which barium hydroxide replaced the lead were confirmatory. They showed extremely bi-sphenoid crystals. The conclusion is thus reached that free formic acid is present in the stinging hairs of the common nettle. [See also *Bot. Absts.* 8, Entry 1461.].—*Ray C. Friesner.*

6625. FARNELL, R. G. Preliminary investigations on the pectic substances of plants. *Internat. Sugar Jour.* 25: 248-251. 1923.—The extraction and properties of plant tissue pectinogen (that is, pectin producing) are described. The yield of dry pectinogen from turnip, onion, and pods of peas was 20, 16, and 8 per cent; the galactan found was 40.9, 34.9 and 17.9 per cent; pentose 37.6, 17.6 and 30.7 per cent; and methoxyl 10.2, 3.2 and 1.9 per cent.—*C. Rumbold.*

6626. HOOKER, H. D., JR. Seasonal changes in the chemical composition of apple spurs. *Missouri Agric. Exp. Sta. Res. Bull.* 40. 51 p., 28 fig. 1920.—Samples of apple spurs with leaves, flowers, or fruit removed were collected 6 times during the year. Three types were investigated: spurs that blossomed and bore fruit; spurs that did not blossom, but which developed fruit-buds; and barren spurs that neither blossomed nor developed fruit-buds. The 1st type was represented by Wealthy, Ben Davis, and Jonathan; the 2nd by Jonathan and Ben Davis,—the Jonathan being the same one from which samples of the 1st type were taken; the 3rd by Ben Davis and Nixonite. Determinations were made of the dry weight, ash, titratable acidity, potassium, phosphorus, total nitrogen, reducing and non-reducing sugars, starch, total polysaccharids and H-ion concentration. In general, official analytical methods of the Association of Official Agricultural Chemists were used. The starch values were obtained by digestion, followed by hydrolysis of the digestion products. Some supplementary microchemical tests were made. The seasonal changes in most of the constituents examined were distinct and characteristic of the condition of the spur,—bearing, non-bearing, or barren. In general the bearing and barren spurs showed extreme values, while the non-bearing spurs assumed intermediate positions. The conditions characteristic of bearing and non-bearing spurs of the same tree (Jonathan) were practically identical with the conditions of spurs from different trees (Ben Davis) in the bearing and in the off-year respectively. Spurs from barren trees were characterized by a seasonal chemical picture distinctly different from the 2 types of spurs from productive trees. For most constituents, the spurs passed through 1 period of maximum content and 1 of minimum content during the course of the year. In the cases of starch and titratable acidity there were 2 maxima and 2 minima, the maxima of 1 coming at approximately the same time as the minima of the other. Carbohydrate consumption and titratable acidity are thought to be correlated. Conditions leading to high starch content at the time of fruit-bud differentiation is considered to be essential for fruitfulness.

Barren spurs and fruit-bearing spurs that developed leaf buds had a low starch content in June. During the late summer and fall there was a steady increase in the phosphorus and nitrogen content of spurs with fruit buds. The absence of this feature in barren spurs suggested that phosphorus and nitrogen storage was connected with the marked increase in these elements that was peculiar to bearing spurs in the spring.—*H. D. Hooker, Jr.*

6627. IRVINE, JAMES COLQUHOUN. Some constitutional problems of carbohydrate chemistry. Jour. Chem. Soc. [London] 123: 898-921. 1923.—This is a discussion of present knowledge regarding the molecular structure of glucose, maltose, cellobiose, lactose, sucrose, cellulose, starch, glycogen, inulin, certain glucosides (salicin, helicin, and populin), and the λ -sugars (forms in which the oxygen ring is displaced from the normal stable position). Numerous diagrams are given showing the arrangement and attachment of atoms and groups of atoms.—*F. E. Denny.*

6628. MURSCHHAUSER, HANS. Das optische Drehungsvermögen der Dextrose unter dem Einfluss von Salzsäure. II. Änderung des Drehungs- und Reduktionsvermögens von Dextroslösungen in Salzsäure bei 100°. [The influence of hydrochloric acid on the optical rotation of dextrose. II. Change in rotation and reducing power of dextrose solution by hydrochloric acid at 100°.] Biochem. Zeitschr. 116: 171-190. 1921.—In an earlier paper it was shown that at room temperature the addition of HCl to dextrose solution hastened the return to the constant rotation of $(L)_d 52.5^\circ$. The addition of HCl to a greater concentration than 2 per cent increased the constant rotation somewhat. This change was also dependent upon the dextrose concentration. In the present paper 20, 10, 5, and 2.25 per cent dextrose solutions were heated at 100°C. for varying lengths of time with 5.1, 8.1, and 10.2 per cent HCl. The 20 and 10 per cent dextrose solutions each exhibited an increase in dextro-rotation on treatment, this increase being greater with the 20 than with the 10 per cent sugar solution. The greater the concentration of HCl the sooner is the peak reached in the 20 per cent solution. In the 10 per cent solution all HCl concentrations are equally effective in increasing the rotation. The decrease in rotation on continued heating is greater the higher the HCl concentration is, but the total decrease is not as great in the 20 per cent as in the 10 per cent dextrose solution. From the beginning of the heating there is a decrease in the reducing power of the solutions. The decrease in reducing power increases with increase in acid content, but the decrease is slightly greater (concentration for concentration) in the 20 per cent than in the 10 per cent dextrose solution. At no time is there an increase in dextro-rotation with the 5 and 2.25 per cent dextrose solutions. The decrease in dextro-rotation is almost parallel with that in 10 per cent solution. The writer explains the increase in dextro-rotation as being due to the formation of isomaltose or some polysaccharid such as dextrin, which has a higher dextro-rotation than the dextrose. There is more of this substance formed in a high concentration of dextrose than in a low concentration. The loss in reducing power would be partly due to the formation of the polysaccharid and partly to a breaking down of the dextrose.—*F. G. Gustafson.*

6629. NAGAYAMA, T. Über die Zerlegung der Brenztraubensäure durch verschiedene Pilze. [The decomposition of pyroracemic acid by fungi.] Biochem. Zeitschr. 116: 303-306. 1921.—*Monilia candida*, *Oidium lactis*, *Aspergillus niger mutante*, *Mucor plumbeus*, *M. Rouxii*, and *M. racemosus* are able to decompose pyroracemic acid into acetaldehyde when present in the nutrient solution. The addition of sulphate increases the yield of acetaldehyde. Nutrient solutions without pyroracemic acid yield no acetaldehyde.—*F. G. Gustafson.*

6630. PATTERSON, JOCELYN. Investigation of the mannan present in vegetable ivory. Jour. Chem. Soc. [London] 123: 1139-1149. 1923.—The endosperm of the seed of the tagua palm was used as material for the investigation of the chemical constitution of the mannan.—*F. E. Denny.*

METABOLISM (NITROGEN RELATIONS)

6631. FRANZEN, HARTWIG, ADOLPH WAGNER, UND ARTUR SCHNEIDER. Über die chemischen Bestandteile grüner Pflanzen. XIII. Über die flüchtigen basischen Stoffe grüner Pflanzen. [Chemical constitutions of green plants. XIII. Volatile bases in green plants.] Biochem. Zeitschr. 116: 208-214. 1921.—It was found by titrating distillates obtained from 28 species with $\frac{N}{10}$ HCl, using methyl red as indicator, that there are volatile bases in green plants. *Rheum Rhaponticum*, required 146 cc. of $\frac{N}{10}$ HCl per kgm. of fresh plant to neutralize the base; *Vitis vinifera*, 88 cc. The other 26 species contained much less volatile base; *Quercus sessiliflora* and *Viburnum lantana* required only 5.5 cc. per kgm. of green material. In 13 of the 28 species examined ammonia was the chief volatile base. Other bases were present in much smaller quantities. The conclusion is drawn that ammonia or substances easily breaking down to ammonia are widely distributed in green plants.—F. G. Gustafson.

METABOLISM (ENZYMES, FERMENTATION)

6632. KOPELOFF, NICHOLAS, C. J. WELCOME, AND LILLIAN KOPELOFF. Prevention of sugar deterioration. Sugar 24: 388-389, 442-443. 1922.—A method of using superheated steam in the centrifugals to prevent sugar deterioration by fungi and bacteria is described.—C. W. Edgerton.

6633. OWEN, WM. LUDWELL. Mold fungi in sugar inversion. Facts about sugar 16: 519-521, 546-548. 1923.—Molds, as well as their extracts, have the power to invert sucrose and consequently cause a deterioration of sugar. Seventeen molds were tested and it was found that these differed widely in their inverting ability. Extracts were also made both from the mycelium and from the spores. An active invertase was obtained from the mycelium but not from the spores. More active extracts were obtained from young cultures than from old ones. In some instances, the fungus extracts were able to invert the sucrose at densities at which the fungus was inactive.—C. W. Edgerton.

6634. OWEN, WM. LUDWELL. Protective inoculation of raw sugar. Sugar 25: 65-68, 117-119, 177-179. 1923.—The inoculation of sugars with suitable types of filamentous yeasts (*Torulae*) prevents the development of fungi and consequently reduces the deterioration of the sugars. The *Torulae* ferment the invert sugar and give off CO₂, which prevents the development of the fungi.—C. W. Edgerton.

6635. WEIMER, J. L., AND L. L. HARTER. Influence of temperature on the pectinase production of different species of *Rhizopus*. Amer. Jour. Bot. 10: 127-132. 1923.—*Rhizopus nigricans*, *R. reflexus*, *R. Tritici*, *R. Artocarpi*, *R. Delemar*, *R. Maydis*, *R. nodosus*, *R. Oryzae*, *R. arrhizus*, *R. microsporus*, and *R. chinensis* were studied. All but the last 2 are parasitic on the sweet potato, producing a pectinase which dissolves the middle lamella, thus macerating the potato. The fungi were grown at 9, 20, 30, and 40°C., and the rate at which the enzyme which was exuded into the solution, as well as that which was retained in the mycelium, would macerate a disc of potato, was determined. The enzyme seems to be produced at any temperature at which the fungus grows. The amount produced was in all cases least at the highest temperature. That in the mycelium increased progressively as the temperature was lowered, and that exuded into the solution showed the same result except that the quantity was slightly reduced as the temperature fell from 20 to 9°C. The nonparasitic species produced a considerable quantity of enzyme, whereas *R. nigricans*, 1 of the parasitic ones, produced a very small amount. In general, the middle lamellae of old potatoes were dissolved in about $\frac{1}{2}$ the time required to macerate the tissue of new ones.—E. W. Sinnott.

6636. WEIMER, J. L., AND L. L. HARTER. Pectinase in the spores of *Rhizopus*. Amer. Jour. Bot. 10: 167-169. 1923.—The spores of 2 species, *Rhizopus nigricans* and *R. Tritici*,

were isolated and their macerating action on raw sweet potato discs tested. Spores of both species were found to contain pectinase capable of dissolving the middle lamella of the sweet potato. The rate of maceration produced by spores of the former species is much slower than that produced by the latter, when the concentration of the spores by weight is the same.—*E. W. Sinnott.*

ORGANISM AS A WHOLE

6637. ADAMS, J. The effect on certain plants of altering the daily period of light. *Ann. Botany* 37: 75-94. 1923.—Plants belonging to 11 common species were darkened in different cases for periods of 1, 2, $3\frac{1}{2}$, and 5 hours daily during June and July in latitude $45\frac{1}{2}^{\circ}$, and compared with undarkened plants. In almost all cases those exposed longest to light showed greatest average height, greatest average weight, and earliest flowering period.—*W. P. Thompson.*

6638. JOHNSTON, EARL S., WILLIAM E. BARRON, AND G. A. LOVELAND. Agricultural meteorology. *Bull. Amer. Meteorol. Soc.* 1: 76-77. 1920.—Methods for determining relations between plant growth and climatic conditions are noted.—*Earl S. Johnston.*

6639. ROSA, J. T., JR. Note on an indirect effect of spraying potatoes with Bordeaux mixture. *Amer. Jour. Bot.* 10: 113-116. 2 fig. 1923.—Potato plants sprayed with Bordeaux remained green about 3 weeks longer, and yielded over $\frac{1}{2}$ more, than unsprayed control plants, presumably because of the reduced injury through tip-burn and hopper-burn. The tubers from the sprayed plots, however, consisted to a large extent of knobby 2nd growths, so that the actual quantity of marketable potatoes was really much less than from the control plots where the tubers were mostly normal. The variety studied was Early Ohio. The author suggests that alternating wet and dry periods, with the resulting intermittent growth, may have been the cause of the 2nd growths, which would thus be more marked in the sprayed plants since their growing season was longer. If 2nd-growth tubers are due to this cause, they should not necessarily be discriminated against for seed purposes.—*E. W. Sinnott.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

6640. SNOW, R. The conduction of geotropic excitation in roots. *Ann. Botany* 37: 43-54. 4 fig. 1923.—When roots of *Vicia faba* are decapitated and placed horizontally they rarely curve down in response to gravity. But when the tips of the decapitated roots are stuck on again with gelatin, the roots in most cases respond in the ordinary way. Therefore, the excitation set up in the tip must be conducted back through the gelatin. When a cut is made half way through a root 2 mm. from the tip and a slip of mica is inserted the root responds strongly whether the cut be on the upper or lower side; the response is doubtful when the cut is lateral. If 2 slips are inserted from any 2 opposite sides no response takes place. Therefore the excitation cannot be conducted back by a sinuous path.—*W. P. Thompson.*

6641. WRIGHT, F. M. O. On the presentation time and latent time for reaction to gravity in fronds of *Asplenium bulbiferum*. *Ann. Botany* 37: 55-62. 1923.—The leaves are negatively geotropic. Their irritability shows a well marked grand period as measured by the presentation time (the shortest period of stimulation required to cause any response on a clinostat). At a very early stage in development, when the apical coil is just above the soil, the presentation time is about 8 hours (at 20°C. and 85 per cent moisture). It decreases to a minimum of $\frac{1}{2}$ hour when the leaf has 5-7 pairs of leaflets unfolded, and then rises to about 6 hours just before the leaf is mature, when irritability is lost. The latent time (period between the beginning of stimulation and the 1st indication of response) has a range of 16-5 hours and its curve is in general similar to that for presentation time, though not affected to so great an extent by the stage of development. Maximum geotropic irritability as judged by minimum presentation time is associated with maximum rate of growth.—*W. P. Thompson.*

TOXIC AGENTS

6642. STOVALL, W. D., AND M. STARR NICHOLS. Chlorination of swimming pool water. *Amer. Jour. Public Health* 13: 478-480. 1923.—“It seems that to maintain a pool in a potentially germicidal condition requires a chlorine residuum of either free or organic chlorine and that the amount will vary enormously with the water used and it seems that there will be found waters in which it will be found impossible to maintain a sufficient residuum owing to the irritating effect of the chlorine on the eyes.” For the present chlorination is to be considered a valuable adjunct to other methods of disinfection and sanitation.—*C. A. Ludwig.*

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 6153, 6157, 6162, 6171, 6172, 6176, 6181, 6187, 6188, 6271, 6426, 6551, 6554, 6608, 6617, 6620)

6643. BRUCE, A. A contribution to the study of the paddy soils of Ceylon and eastern countries. *Dept. Agric. Ceylon Bull.* 57. 54 p. 1922.

6644. BRUCE, A. Forest soils of Ceylon. *Dept. Agric. Ceylon Bull.* 61. 30 p. 1923.

6645. SCHNEIDEWIND. Neue Düngungsversuche. [New fertilizer experiments.] *Mitteil Deutsch. Landw. Ges.* 38: 139-141. 1923.—A report on comparative tests of various forms of nitrogen, phosphorus and potash on rye, oats, potatoes and sugar beets. Sodium nitrate was the most efficient form of nitrogen. On light sands poor in lime Thomas phosphate was better than superphosphate. Raw rock was useful only on highly acid soils such as high moors, while the value of the different forms of potash varied with the crop.—*A. J. Pieters.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 6241, 6251, 6296, 6350, 6351, 6424, 6425, 6461)

GENERAL

6646. ANONYMOUS. The botanical survey of British Malaya. [Rev. of: RIDLEY, H. N. *The flora of the Malay Peninsula*. Vol. 1. Polypetalae. xxx + 918 p. L. Reeve & Co.: London, 1922 (see *Bot. Absts.* 12, Entry 6124).] *Nature* 111: 6-7. 1923.—This review is mainly a brief summary of botanical surveys and publications dealing with the region.—*O. A. Stevens.*

6647. ALMQUIST, E. Linné und das natürliche Pflanzensystem. [Linnaeus and the natural plant system.] *Bot. Jahrb. Beiblatt* 128: 1-16. 1922.—The author attempts to present a clearer view than is ordinarily held of Linnaeus' conception of a natural system of classification. In so doing he correlates Linnaeus' views with those of Goethe, with the selection theory, and with Mendelism. Linnaeus held that there was an orderly relation of organisms from the simplest to the highest, but he did not conceive of actual descent except in limited groups. Species of a genus he thought may have come from a single original species; genera of a family from a single original genus. The multiplicity of species he believed due to hybridization. Linnaeus founded his species on characters which were not variable. Cultural variation of an ecological nature he omitted in his floras as well as monstrosities and pathological forms. Mendelism is in line with Linnaeus' idea of the origin of species by crossing, and tends to substantiate his hypothesis. The species concept in bacteria is discussed, also Linnaeus' "collective species," in which he employs trinomial instead of binomial nomenclature.—*K. M. Wiegand.*

6648. ASCHERSON, PAUL, UND PAUL GRAEBNER. *Synopsis der mitteleuropäischen Flora.* [Synopsis of the flora of central Europe.] Lieferung 92. Vol. VII. P. 401-480. Wilhelm Engelmann: Leipzig, Feb. 27, 1917.—This part continues the treatment of the Euphorbiaceae and includes the indigenous genera *Chrozophora*, *Mercurialis*, and *Euphorbia* in part. Four exotic genera are represented in the flora of central Europe through the following plants which have become there established: *Mallotus japonicus* Muell. Arg., *Acalypha virginica* L., *A. mexicana* Muell. Arg., *Ricinus communis* L., and *Homalanthus populifolius* Graham.—*J. M. Greenman.*

6649. BURNHAM, STEWART H., AND ROY A. LATHAM. *Flora of the Town of Southold, Long Island* (third supplementary list, part 2). *Torreyia* 23: 25-31. 1923.—This final installment includes 10 species of Polyporaceae, 4 of Agaricaceae, 3 of Gasteromycetes, 2 of Hepaticae, 12 of Musci, 1 of Pteridophyta and 67 of Spermatophyta. The total number of species reported in all the lists is 2,461, of which 1,130 are flowering plants.—*J. C. Nelson.*

6650. FYSON, P. F. [Rev. of: RANGACHARIAR, K., AND C. TADULINGAM. *A handbook of South Indian grasses.* Government Press: Madras, 1921.] *Jour. Indian Bot.* 3: 124-125. 1922.

6651. GARDNER, G. A. *Nouvelles observations. Réponse au Rév. Père Fontanel, S. J.* [New observations. A reply to Rev. Father Fontanel, S. J.] *Nat. Canadien* 48: 267-270. 1922.—The habitat, color, size and general appearance of plants are the characters which permit the determination of a species, and the author maintains that the number of species of violets, for instance, are not exaggerated. Perfume may also be a determining character. Further illustrations are taken from the various forms of *Hepatica*.—*A. H. MacKay.*

6652. JONES, CHAPIN. *Common forest trees of Virginia. A pocket manual describing their most important characteristics.* Virginia Geol. Commission Bull. 26. 2nd. ed., 64 p. 1923.—The author describes in non-technical terms 62 of the common trees of Virginia. The text is supplemented by figures showing the distinctive characters of each species.—*J. M. Greenman.*

6653. MACWATT, JOHN. *The primulas of Europe.* 8 vo, 208 p., 49 illus. (8 col.) Published at the offices of "Country Life," and by George Newnes: London; also Charles Scribner's Sons: New York, 1922.—The author of this volume has devoted years of study to the primroses and has embodied in this book some of the results obtained from a long experience in cultivating this selective group of plants. The systematic treatment is adapted largely from the work of Pax to whom due acknowledgement is made. A rather extended bibliography, readable descriptions, and excellent illustrations from photographs, some of which are colored, are outstanding features of the work.—*J. M. Greenman.*

6654. NELSON, JAMES C. [Rev. of: CHASE, AGNES. *A first book of grasses.* 121 p., 94 fig. The Macmillan Co.: New York, 1922.] *Torreyia* 23: 33-34. 1923.—The spikelet is taken as the basis of classification, and its modifications are studied in the order of their increasing complexity, beginning with the Festuceae. The book is sound in its pedagogy, and strictly scientific in method.—*J. C. Nelson.*

6655. RIDLEY, HENRY N. *The flora of the Malay Peninsula.* Vol. II. *Gamopetalae.* 8 vo, 672 p., 76-131 fig. L. Reeve & Co.: London, 1923.—This volume follows closely the plan of the previous one [see Bot. Absts. 12, Entry 6124] and includes the families Caprifoliaceae to Labiatae, likewise arranged essentially in the sequence of Bentham and Hooker's *Genera Plantarum*. The following new species, varieties, and combinations are included: *Argostemma involucratum* Hemsl. var. *glabrum* and var. *hirsutum* (*A. hirtum* Ridl.), *Ophiorrhiza major* (*O. erubescens* King, not Wall.), *O. rosacea* (*O. rosea* Ridl., not Hook. f.), *O. pallidula*, *O. scabrella*, *O. fruticosa* (*O. fruticulosa* Ridl., not Nadeaud.), *Hedyotis globiceps*, *Mussaenda*

spectabilis, *M. malaccensis*, *M. angustisepala* (*M. Teysmanniana* King, not Miq.), *M. cordifolia* Wall. var. *pubescens*, *Mycetia Scortechinii* (*Adenosacme Scortechinii* King & Gamble), *M. lanceolata* (*A. lanceolata* Ridl.), *M. flava* (*A. flava* Ridl.), *Urophyllum glabrum* Wall. var. *Blumeianum*, *U. sessiliflorum*, *Randia stenopetala* (*Gardenia stenopetala* King), *Petunga floribunda* (*P. Roxburghii* var. *floribunda* King), *Isora humilis* King & Gamble var. *Scortechinii* (*I. Scortechinii* King & Gamble), *Pavetta pauciflora*, *P. naucleiflora* Wall. var. *longifolia*, *Tarenna Napieri* (*Webera Napieri* Ridl.), *T. papillosa* (*Stylocoryna adpressa* var. *papillosa* King), *T. Evansii*, *T. rudis*, *T. salicina* (*Webera salicina* Ridl.), *T. pulchra* (*W. pulchra* Ridl.), *T. longifolia* (*W. longifolia* Hook. f.), *T. grandifolia* (*W. grandifolia* Hook. f.), *T. odorata* (*W. odorata* Roxb.), *T. Yappii* (*W. Yappii* King), *T. Wrayi* (*W. Wrayi* King), *T. Wallichii* (*W. Wallichii* Hook. f.), *T. Ridleyi* Pearson (*W. Ridleyi* Pearson), *T. stellulata* (*W. stellulata* Hook. f.), *T. Curtisii* (*W. Curtisii* King), *T. adangensis* (*W. adangensis* Ridl.), *T. calcarea*, *Timonius peduncularis* (*Guettarda peduncularis* Wall.), *Prismatomeris malayana* (*P. albiflora* King, not Thw.), *Morinda Scortechinii* (*M. umbellata* var. *Scortechinii* King & Gamble), *M. Ridleyi* (*M. umbellata* var. *Ridleyi* King & Gamble), *Psychotria pachyphylla* (*P. sarmentosa* var. *pachyphylla* King & Gamble), *P. sarmentosa* Bl. var. *montana*, *P. lanceolaria*, *P. Griffithii* Hook. f. var. *angustifolia*, *P. atroviridis*, *Cephaelis melanocarpa*, *Streblosa microcarpa* (*Psychotria microcarpa* Wall.), *Lasianthus stipularis* Bl. var. *hirtus*, *L. pilosus* Wight var. *setosus* (*L. setosus* Wight), *L. Maingayi* Hook. f. vars. *hirta* and *subglabra*, *L. Harveyanus* King & Gamble var. *longifolia*, *Borreria laevicaulis* (*Bigelovia laevicaulis* Miq.), *B. pilulifera*, *B. parviceps*, *B. setidens* (*Bigelovia setidens* Miq.), *Vernonia javanica* DC. var. *mollissima*, *Gynura malasica* (*G. zeylanica* var. *malasica* Ridl.), *Agapetes perakensis* (*A. Griffithii* King, not Clarke), *A. Wrayi*, *Rhododendron orion* Ridl. var. *aurantiacum*, *Pernettyopsis breviflora* (*Diplycosia breviflora* Ridl.), *Maesa lancifolia*, *M. oocarpa* (*M. ovocarpa* Ridl.), *Embelia rugosa* (*E. ribes* var. *rugosa* King & Gamble), *E. subcordata*, *Labisia pothoina* Lindl. vars. *alata* and *lanceolata*, *Ardisia andamanica* Kurz var. *latifolia*, *A. Vaughani*, *Siderozylon littorale*, *Bassia hirtiflora*, *B. caudata*, *B. Watsoni*, *B. laurifolia* King & Gamble vars. *typica*, *obtusata* and *parvifolia*, *B. Motleyana* Clarke var. *Scortechinii*, *Maba buxifolia* Pers. var. *rhomboidea*, *Diospyros tubicalyx*, *D. pubicarpa*, *D. cymosa*, *D. latiseppala* (*D. paniculata* King, not Dalziel), *Symplocos adenophylla* Wall. var. *montana*, *Cordyloblaste confusa* (*Symplocos confusa* Brand), *C. pulcherrima* (*S. pulcherrima* Ridl.), *C. obovata* (*S. obovata* Ridl.), *C. crenulata* (*S. crenulata* Ridl.), *C. Maingayi* (*S. Maingayi* Clarke), *C. Scortechinii* (*S. Scortechinii* King & Gamble), *Linociera caudifolia* (*L. caudata* King & Gamble, not Bedd.), *Olea penangiana* (*O. dentata* King, not Wall.), *Willughbeia flavesces* Dyer var. *rufescens* (*W. rufescens* Dyer), *Kopsia singapurensis* (*K. fruticosa* var. *albiflora* King & Gamble), *Ervatamia pauciflora* and var. *minor*, *Alstonia latifolia* (*A. angustifolia* var. *latifolia* King & Gamble), *Dregea stellaris* (*Marsdenia stellaris* Ridl.), *Hoya rufo-lanata*, *Phytosotelma Wrayi* (*Hoya Wrayi* King & Gamble), *Norrisia malaccensis* Gardn. var. *major* (*N. major* Solereder), *Fagraea pauciflora* (*F. racemosa* var. *pauciflora* King & Gamble), *Cryptophyllum giganteum* (*Fagraea gigantea* Ridl.), *Gaertnera acuminata* Benth. vars. *oxyphylla* (*G. oxyphylla* Benth.) and *montana*, *Datura fastuosa* L. vars. *typica* and *alba*, *Utricularia vitellina* (*U. aurea* Ridl., not Lour.), *U. albina* (*U. albiflora* Griff., not Br.), *Aeschynanthus breviflora* (*A. parviflora* Ridl., not Spreng.), *Didissandra petiolata*, *Didymocarpus sulphurea* Ridl. vars. *breviflora* and *grandiflora*, *D. urticaefolia*, *D. hispida* Ridl. var. *selangorensis*, *D. malayana* Hook. f. var. *fasciata*, *D. reptans* Jack var. *modesta* (*D. modesta* Ridl.), *D. Curtisii* (*D. crinita* var. *Curtisii* Ridl.), *Chirita parvula*, *C. sericea* Ridl. var. *Scortechinii*, *Paraboea cordata* Ridl. var. *ophirensis*, *P. tiumanica* Burkill, *P. salicina* (*Didymocarpus salicina* Ridl.), *P. grandifolia* (*D. grandifolia* Ridl.), *P. capitata* Ridl. var. *oblongifolia*, *Codonoboea leucocodon* (*Paraboea leucocodon* Ridl.), *C. ericaeflora* (*Didymocarpus ericaeflora* Ridl.), *C. lilacina* (*D. lilacina* Ridl.), *Boea lancifolia*, *B. minutiflora*, *Cyrtandra cupulata* Ridl. var. *minor*, *Pandorea Curtisii* (*Tecoma Curtisii* Ridl.), *Staurogyne longifolia* Kuntze var. *condensata*, *Hygrophila phlomoidea* Nees var. *angusta*, *Nomaphila stricta* Nees var. *minor* (*N. minor* Clarke) and var. *corymbosa* (*N. corymbosa* Bl.), *Srobilanthes phoeniceus* (*S. violacea* Ridl., not Bedd.), *Lepidagathis Yappii*, *Pseuderanthemum hirtipistillum* (*Eranthemum hirtipistillum* Clarke), *P. breviflos* (*E. breviflos* Clarke), *P. candidum* (*E. candidum* Ridl.), *P. caudifolium* (*E. caudifolium* Clarke), *P. selangorense* (*E. selangorense* Clarke), *P. sylvestre*, *P. Kingii* (*E. Kingii*

Clarke), *P. graciliflorum* (*E. graciliflorum* Nees), *P. Teysmanni* (*E. Teijsmanni* Clarke), *Calophanoides quadrifaria* (*Justicia quadrifaria* Wall.), *Justicia vegeta* Ridl. var. *terminalis*, *J. Clarkeana* (*Rungia laxiflora* Clarke), *J. ovalis*, *Ptyssiglottis parviflora* (*Pseuderanthemum parviflorum* Ridl.), *P. densiflora* (*Leda densiflora* Clarke), *P. flava* (*L. flava* Ridl.), *P. chrysea*, *P. rubro-lutea*, *Polytrema aequale* and var. *minor*, *Peristrophe acuminata* Nees var. *salicifolia* (*P. salicifolia* Miq.), *Callicarpa furfuracea*, *Premna rubens* (*P. flavescens* var. *rubens* Clarke), *P. integrifolia* L. var. *minor*, *P. angustior* (*P. integrifolia* var. *angustior* Clarke), *Clerodendron deflexum* Wall. var. *bracteatum*, *Vitex trifolia* L. var. *repens*, *Avicennia lanata*, and *A. sphaerocarpa* Stapf.—*J. M. Greenman.*

6656. SABNIS, T. S. The flora of Sind. Jour. Indian Bot. 3: 151-153, 178-180. 1923. (To be continued.)—The author is extending his investigations on the physiological anatomy of the plants of the Indian Desert. Part I will include a list of plants with their localities and distribution, and Part II will deal with the physiological anatomy and ecology of the flora. The plant list so far, based on Bentham and Hooker's system, includes 10 families, 21 genera, and 32 species. *Cleome brachycarpa* Vahl var. *longepetiolata* is described as a new variety. [See also Bot. Absts. 5, Entry 1904; 6, Entry 771; 11, Entry 4222.]—*Winfield Dudgeon.*

6657. SARASIN, FRITZ, UND JEAN ROUX. Nova Caledonia. Forschungen in Neu-Caledonien und auf den Loyalty-Iseln. Botanik. [New Caledonia. Researches in New Caledonia and on the Loyalty Islands. Botany.] 4 to. Vol. I-L. ii. P. 89-176, pl. 5-6. C. W. Kreidel's Verlag: Berlin and Wiesbaden, 1920.—The present part [see also Bot. Absts. 12, Entry 896] of this extensive work was edited by HANS SCHINZ and A. GUILLAUMIN. The groups of plants included and some of the specialists who have cooperated are: Fungi of New Caledonia and the Loyalty Islands by E. M. WAKEFIELD; Lichenes (Supplement) by A. D. COTTON; Hepaticae (Supplement) by FRANZ STEPHANI; Algae by R. MIRANDE; Lycopodiales (Supplement) by HANS SCHINZ; Siphonogamæ (Coniferae to Elaeocarpaceae) by HANS SCHINZ and A. GUILLAUMIN. The following new species and new variety of fungi are described: *Amanita pumila* Mass., *Marasmius sulcatus* Mass., *Favolus Sarasini* Wakefield, *Stereum umbro-alutaceum* Wakefield, *Clavaria Sarasini* Cotton, *Lachnocladium neglectum* Mass., *Dacryomitra tenuis* Wakefield, *Le Ratia coccinea* Mass. & Wakefield, *Xylaria hirtella* Wakefield, *Nectria nigro-ostiolata* Wakefield, and *Sarcoscypha coccinea* Jacq. var. *minor* Wakefield. New species and combinations among the flowering plants are: *Mariscus pennatus* Schinz & Guillaumin (*Cyperus pennatus* Lam.), *M. Deplanchei* Schinz & Guillaumin (*Baumea Deplanchei* Boeckl.), *Basselinia eriostachys* Beccari (*Cyphokentia eriostachys* Brongn.), *Campecarpus fulcita* Beccari (*Kentia fulcita* Brongn.), *Piper austro-caledonicum* C. DC. var. *crassispicum* C. DC., *P. staminodiferum* C. DC., *Peperomia kanalensis* C. DC., *P. lifuana* C. DC., *P. Sarasinii* C. DC., *Pachygone loyaltiensis* Diels, *Nasturtium sarmentosum* Schinz & Guillaumin (*Cardamine sarmentosa* Forster), *Acacia simplicifolia* Schinz & Guillaumin (*Mimosa simplicifolia* L. f.), *Arthroclanthus ischnopodus* Guillaumin, *Cajanus pseudocajan* Schinz & Guillaumin (*Cytisus pseudo-cajan* Jacq.), *Zanthoxylum Sarasinii* Guillaumin, *Geijera Balansae* Schinz & Guillaumin, (*Zanthoxylum Balansae* Baill.), *Erodia ignambiensis* Guillaumin, and *Cleidion Vieillardii* Baill. var. *mareense* Guillaumin.—*J. M. Greenman.*

6658. SARGENT, CHARLES SPRAGUE. Manual of the trees of North America (exclusive of Mexico). 2nd ed., 8 vo, xxvi + 910 p., 783 fig., 1 map. Houghton Mifflin Company: Boston & New York, 1922 (Price \$12.50).—The 1st edition of this manual was published in 1905. Since that time knowledge of the trees of North America has been greatly advanced, largely through the activities of the author of this work; and the present edition embodies much of the additional information acquired. Eighty-nine species, many varieties, and 141 illustrations have been added in the new edition. Comparatively few of the species recognized in the former edition have been reduced to the rank of varieties or to synonymy. It is noteworthy that in this work there have been relatively few changes in plant names. The more important generic names which have been changed are the following: *Tumion* Raf. gives way to *Torreya* Arn.; *Serenoa* Hook. f. to *Acoelorrhaphe* H. Wendl.; *Hicoria* Raf. to *Carya* Nutt.; *Pasania* Oerst.

to *Lithocarpus* Bl.; *Toxylon* Raf. to *Maclura* Nutt.; *Pisonia* L. to *Torrubia* Vell.; *Zygia* P. Br. to *Pithecolobium* Mart.; *Fagara* L. to *Xanthoxylum* L.; *Fremontodendron* Cov. to *Fremonia* Torr.; *Chytraculia* P. Br. to *Calyptanthus* Sw.; *Xolisma* Raf. to *Lyonia* Nutt.; *Icacorea* Aubl. to *Ardisia* Sw.; *Crescentia* L. to *Enallagma* Bail. While these alterations have necessarily required a change in the binomial they have not resulted in new combinations. Some of the species recognized in the former edition, which fall to synonymy are: *Yucca arborescens* Trel. = *Y. brevifolia* Engelm.; *Yucca radiosa* Trel. = *Y. elata* Engelm.; *Salix Nuttallii* Sarg. = *S. Scouleri*-ana Barr.; *Quercus californica* Coop. = *Q. Kelloggii* Newb.; *Quercus nana* Sarg. = *Q. ilicifolia* Wang.; *Persea pubescens* Sarg. = *P. palustris* Sarg.; *Sassafras* *Sassafras* Karst. = *S. officinale* Nees & Ebermaier; *Cercis texensis* Sarg. = *C. reniformis* Engelm.; *Metopium* *Metopium* Small = *M. toxiferum* Kr. & Urb.; *Rhus hirta* Sudw. = *R. typhina* L.; *Gyminda Grisebachii* Sarg. = *G. latifolia* Urb.; *Tilia americana* L. = *T. glabra* Vent. The groups having the largest number of additional species are the hawthorns and lindens. The present edition recognizes 153 species of *Crataegus* instead of 132; and *Tilia* now includes 15 instead of 6 species.—*J. M. Greenman.*

PTERIDOPHYTES

6659. D'ALMEIDA, J. D. The Indian Ophioglossums. Jour. Indian Bot. 3: 58-65. 1 pl. 13 fig. 1922.—Six species are recognized. *O. vulgatum* L. var. *Aitchisoni* C. B. Clarke is given specific rank, as *O. Aitchisoni*.—*Winfield Dudgeon.*

6660. FORBES, CHARLES N. Notes on *Marsilea villosa* Kaulf. Occasional Papers Bernice P. Bishop Mus. 7: 47-49. Pl. 13-14. 1920.—Comments are made on former collections of this plant and on the occurrence of a station for it in Palolo Valley, Honolulu. It is concluded "that *M. villosa* Kaulf. and *M. vestita* Hook. & Grev. are the same species."—*H. F. Bergman.*

6661. F[YSON], P. F. [Rev. of: BLATTER, E., AND J. F. D'ALMEIDA. The ferns of Bombay. 22 p., 17 pl. (2 col.), 45 fig. D. B. Taraporevala Sons & Co.: Bombay, (1922) (see Bot. Absts. 12, Entry 4636).] Jour. Indian Bot. 3: 157-158. 1923. [See also Bot. Absts. 12, Entry 4637.]

6662. MAXON, WM. R. Ferns new to the Cuban flora. Jour. Washington [D. C.] Acad. Sci. 12: 437-443. 1922.—From material collected in the higher mountainous regions of Cuba, the writer has described 4 new species and cited 22 other species new to Cuba. A number of these have previously been known only from Jamaica. The new species are: *Cyathea producta* of the Cyatheaceae, *Dicranopteris Leonis* of the Gleicheniaceae; *Polypodium calvum* and *Psilogramme cubensis* of the Polypodiaceae.—*Helen M. Gilkey.*

6663. MAXON, WM. R. The genus *Microstaphyla*. Jour. Washington [D. C.] Acad. Sci. 13: 28-31. 1923.—The rank of this genus, founded by Presl but since much disputed, is discussed, and the writer accepts it as a valid genus. A new species, *M. columbiana*, is described, and the principal synonymy of the 2 previously known species, cited.—*Helen M. Gilkey.*

6664. MOUSLEY, HENRY. Further notes on the ferns of Hatley, Stanstead County, Quebec, 1921-22. Canadian Field Nat. 36: 149-152. 1922.—The addition of 6 ferns now brings the total number for this region to 47 species and varieties.—*W. H. Emig.*

6665. MOUSLEY, HENRY. The alpine maidenhair fern (*Adiantum pedatum* L. var. *aleuticum* Rupr.) at Hatley, Stanstead County, Quebec. Canadian Field Nat. 37: 84-85. 1923.—This fern is rare in the eastern part of Canada and the U. S. A.—*W. H. Emig.*

SPERMATOPHYTES

6666. BAILEY, L. H. The cultivated Brassicas. Gentes Herbarum 1: 53-108. Fig. 18-49. 1922.—After interesting introductory remarks discussing problems of the taxonomy of cultivated plants in general, principles of generic and specific segregation, and the history of the genus *Brassica* with which *Sinapis* is united, the author gives a key to the 19 species recognized,

followed by the enumeration of the species and varieties with citation of synonyms and with full descriptions and illustrated by 31 figures. The following new species and new varieties are proposed: *Brassica alboglabra*, *B. Napobrassica* Mill. var. *solidifolia*, *B. Rapa* L. var. *lorifolia*, *B. nipposinica* and var. *laciniifolia*, *B. juncea* Coss. var. *crispifolia*, var. *japonica* (Thunb.), var. *multisecta*, *B. narinosa*, *B. parachinensis*, *B. dubiosa*.—Alfred Rehder.

6667. BEAUVERD, G. A propos du *Primula farinosa* forma *flexicaulis*. [Remarks on *Primula farinosa* forma *flexicaulis*.] Bull. Soc. Bot. Genève 13: 16. 1921.

6668. BEAUVERD, G. Contributions à la flore de l'Amerique du Sud. [Contributions to the flora of South America.] Bull. Bot. Soc. Genève 13: 7-8, 267-270. 1921.—Two new species and several varieties of plants from Uruguay are described. These are: *Nothoscordion Felipponei* Beauverd, *Alternanthera Felipponei* Beauverd, *Mollugo verticillata* L. subsp. *subsessilis* Beauverd & Felippone, *Oxalis Sellowiana* Zucc. var. *caulescens* Beauverd & Felippone, *O. articulata* Savi var. *nodulosa* Beauverd & Felippone, *Polygala linoides* Poir. var. *ambigua* Felippone & Beauverd, *Echium plantagineum* L. var. *monodasystemon* Beauverd & Felippone, and *Richardsonia brasiliensis* Gomez var. *dubia* Beauverd & Felippone.—W. H. Emig.

6669. BEAUVERD, G. Nouvelles Mutisiées des Andes de Bolivie. [New Mutisieae (Compositae) from the Bolivian Andes.] Bull. Soc. Bot. Genève 13: 10-11. 1921.—Several new plants here named will be described in a later issue of the Bulletin.—W. H. Emig.

6670. BEAUVERD, G. Une race nouvelle du *Primula hirsuta* All. en Valais. [A new variety of *Primula hirsuta* All. in Valais.] Bull. Soc. Bot. Genève 13: 11. 1921.—The plant is characterized as *Primula hirsuta* All. var. *serrulata* Bvrd. n. var.—W. H. Emig.

6671. BLAKE, S. F. Two new species of letterwood (*Piratinera*). Jour. Washington [D.C.] Acad. Sci. 12: 391-399. Fig. 1. 1922.—The heartwood of several species of *Piratinera* belonging to the family Moraceae and native to the Guianas, has long formed a timber of commerce, used principally in the manufacture of walking sticks, umbrella handles, and violin bows. From new material received from British and Dutch Guiana, the author has described 2 new species, *Piratinera scabridula* and *P. velutina*, and has reduced *P. discolor* Pittier to *P. guianensis* Aubl. Full descriptions of the new species, citations of the 4 previously known, and a key to all the species of the genus, are included.—Helen M. Gilkey.

6672. BRITTON, NATHANIEL LORD. Studies of West Indian plants—XI. Bull. Torrey Bot. Club 50: 35-56. 1923.—From Cuba are described the following new species: *Juniperus saxicola* Britton & Wilson, *Myrica cacuminis* Britton & Wilson, *Pilea oralifolia* Britton & Wilson, *P. membranacea* Britton & Wilson, *P. micromeriaefolia* Britton & Wilson, *P. yarensis* Britton & Wilson, *P. ermitensis* Britton, *P. crenata* Britton & Wilson, *Coccolobis monticola* Britton, *C. saxicola* Britton, *Talauma* (?) *orbiculata* Britton & Wilson, *Persea anomala* Britton & Wilson, *P. similis* Britton & Wilson, *Nectandra reticularis* Britton & Wilson, *Rubus turquinensis* Rydberg, *Polygala scabridula* Blake, *P. rhynchosperma* Blake, *P. ambigens* Blake, *Maytenus saxicola* Britton & Wilson, *Rhamnidium bicolor* Britton & Wilson, *Ouratea xolismaefolia* Britton & Wilson, *Taonabo monticola* Britton & Wilson, *T. Leonis* Britton & Wilson, *Haemocharis angustifolia* Britton & Wilson, *Begonia lomensis* Britton & Wilson, *Ginoria montana* Britton & Wilson, *Psidium* (?) *cacuminis* Britton & Wilson, *Calyptranthes montana* Britton & Wilson, *Eugenia cati* Britton & Wilson, *E. ginoriaefolia* Britton & Wilson, *E. lomensis* Britton & Wilson, *E. brevipetiolata* Britton & Wilson, *E. rigidula* Britton & Wilson, *Ananomis reticulata* Britton & Wilson, *Graffenrieda rufescens* Britton & Wilson, *Miconia plumieriaefolia* Britton & Wilson, *Rapanea microphylla* Britton & Wilson, *Symplocos Leonis* Britton & Wilson, *Plumiera montana* Britton & Wilson, *Marsdenia bicolor* Britton & Wilson, *Sebasten Leonis* Britton & Wilson, *Varronia longipedunculata* Britton & Wilson, *Salvia scopulorum* Britton & Wilson, *Rondeletia naguensis* Britton & Wilson, *R. calophylla* Standley, *Guettarda cryptantha* Standley, *G. cobrensis* Standley, *Stenostomum apiculatum* Britton & Standley, *Psychotria*

Leonis Britton & Wilson, *Lobelia cacuminis* Britton & Wilson, *Senecio Leonis* Britton & Wilson, and *Chaptalia montana* Britton. From Trinidad are described: *Bactris savannarum* Britton, *Pilea aripoensis* Britton, *Inga ierensis* Britton, *Serjania ierensis* Britton, *Clusia intertexta* Britton, *C. aripoensis* Britton, *Stylogyne tenuifolia* Britton, *Prestonia Fendleri* N. E. Brown, *Cordia ierensis* Britton, *Aegiphila trinitensis* Britton, *Anguria elliptica* Britton; from Porto Rico: *Scleria doradoensis* Britton, *S. Stevensiana* Britton, *Lagenocarpus portoricensis* Britton, *Rynchospora Blauneri* Britton, and *R. luquillensis* Britton; and from Hayti, *Siphocampylus pinnatisectus* Gleason.—P. A. Munz.

6673. FARWELL, OLIVER A. Notes on the Michigan Flora III. Rept. Michigan Acad. Sci. 22: 177-185. 1920.—Reports on additions to the known vascular flora of Michigan are recorded. The following new forms or combinations are given: *Setaria italica* (L.) Beauv. f. *praecox* (Alef.) n. comb. (*Panicum italicum* var. *praecox* Alef., *S. italica* var. *germanica* Hitchc.), *Setaria italica* var. *germanica* f. *Metzgeri* (Korn.) n. comb. (*Panicum italicum* var. *Metzgeri* Korn.), *Setaria italica* f. *macrochaeta* (Korn.), n. comb. (*P. italicum* var. *macrochaetum* Korn.), *Sporobolus cryptandrus* (Torr.) Gray var. *involutus* n. var., *Panicularia nervata* (Willd.) Kuntze var. *viridis* n. var., *Carex cristata* Schwein. f. *ellipsoidalis* n. f., *C. sterilis* Willd. f. *flexibilis* n. f., *C. cephalophora* Muhl. var. *bracteosa* n. var., *C. Grayii* Carey var. *rariiflora* n. var., *Polygonatum canaliculatum* Pursh var. *oblongifolium* n. var., *Allionia aggregata* (Ortega) Spreng. var. *hirsuta* (Pursh) n. comb. (*Allionia hirsuta* Pursh.), *Lespedeza frutescens* (L.) Britton var. *acutifructa* n. var., *Viola sagittata* Ait. var. *subsagittata* (Greene) n. comb. (*Viola subsagittata* Greene), *Scrophularia marilandica* L. var. *viridis* n. var., *Plantago lanceolata* L. f. *composita* n. f., *Helianthus divaricatus* L. var. *ternatus* n. var., *Senecio obovatus* Muhl. var. *minor* n. var., *Artium minus* f. *pallidum* n. f. A remarkable addition to the flora of Michigan is the crucifer *Hymenophysa pubescens* C. A. Meyer, discovered well established at Ypsilanti by B. A. Walpole. This is native to the Altai region of central Asia.—Ernst A. Bessey.

6674. FARWELL, OLIVER ATKINS. Notes on the Michigan flora IV. Papers Michigan Acad. Sci. 1: 85-100. 1923.—Notes are given on species new to the known flora of Michigan, together with some new species, varieties, or combinations. These are as follows: *Panicum Bicknellii* Nash var. *Bushii* (Nash) n. comb. (*P. Bushii* Nash), *Echinochloa Crusgalli* (L.) Beauv. f. *sabulicola* (a correction for the typographical error f. *sabulonum* Farwell), *Chaetochloa verticillata* (L.) Scribn. var. *brevisetata* (Godr.) n. comb. (*P. verticillatum* var. *brevisetum* Godr.), *C. viridis* (L.) Scribn. var. *major* (Gaud.) n. comb. (*P. viride* var. *majus* Gaud.), *C. viridis* (L.) Scribn. var. *minor* (Koch.) n. comb. (*Setaria viridis* var. *minor* Koch), *C. viridis* (L.) Scribn. var. *brevisetata* (Doell) n. comb. (*P. viride* var. *brevisetum* Doell), *C. italica* (L.) Scribn. f. *praecox* (Alef.) n. comb. (*P. italicum* var. *praecox* Alef.), *C. italica* (L.) Scribn. var. *germanica* (Roth) n. comb. (*P. germanicum* Roth), *C. italica* var. *germanica* (Roth) Farwell f. *Metzgeri* (Koern.) n. comb. (*P. italicum* var. *Metzgeri* Koern.), *C. italica* var. *germanica* (Roth) Farwell f. *macrochaeta* (Koern.) n. comb. (*P. italicum* var. *macrochaetum* Koern.), *Agrostis perennans* var. *humilis* n. var., *Graphephorum Cooleyi* (A. Gr.) n. comb. (*Dupontia Cooleyi* A. Gr.), *Lepturus incurva* (L.) n. comb. (*Aegilops incurva* L., *Lepturus incurvatus* Trin.), *Carex cephalophora* Muhl. var. *anomala* n. var., *C. vulpinoidea* Mx. var. *annectens* (Bicknell) n. comb. (*C. annectens* Bicknell), *C. sparaganioides* Muhl. var. *lutea* n. var., *Juncus Torreyi* Coville f. *longipes* n. f., also f. *brevipes* n. f. and var. *paniculata* n. var., *Habenaria hyperborea* (L.) R. Br. var. *media* (Rydb.) n. comb. (*Limnorchis media* Rydb.), also var. *huronensis* (Nutt.) n. comb. (*Orchis huronensis* Nutt.), *Polygonum amphibium* var. *marginatum* Farwell f. *hirtuosum* n. f., *Amaranthus Torreyi* (Gray) Benth. f. *prostratus* n. f., *Anemone quinquefolia* L. var. *bifolia* n. var., *Bursa Bursa-pastoris* (L.) Britton var. *minor* (DC.) n. comb. (*Capsella Bursa-pastoris* var. *minor* DC.), *Meibomia nudiflora* (L.) O.K. f. *foliolata* n. f., *Rhus copallina* L. f. *crispa* n. f., *Oenothera muricata* L. var. *rubricaulis* n. var., *Uraspermum aristatum* (Thunb.) var. *villicaule* (Fernald) n. comb., *Gentiana Billing-tonii* n. sp., *Teucrium occidentale* A. Gr. var. *menthifolium* (Bickn.) n. comb. (*T. menthifolium* Bicknell), *T. canadense* var. *virginicum* (L.) n. comb. (*T. virginicum* L.), *Dracocephalum*

virginianum L. var. *speciosum* (Sweet) n. comb. (*Physostegia virginiana* var. *speciosa* A. Gr.), *D. denticulatum* Ait. var. *obovatum* (Ell.) n. comb., *Aureolaria heterophylla* (Nutt.) n. comb. (*Gerardia heterophylla* Nutt.), *A. Skinneriana* (Wood) Farwell var. *asperula* (A. Gr.) n. comb. (*Gerardia tenuifolia* var. *asperula* A. Gr.), *A. tenuifolia* (Vahl.) Farwell var. *Gattingeri* (Small) n. comb. (*Gerardia Gattingeri* Small), *A. Skinneriana* f. *pallida* n. f., *Plantago Rugelii* Dene. var. *asperula* n. var., *P. Rugelii* var. *alterniflora* n. var., *Solidago bicolor* var. *concolor* T. & G. f. *ramosior* n. f., *S. neglecta* T. & G. var. *simulata* n. var., *Sericocarpus asteroides* (L.) B.S.P. f. *albopapposus* n. f., *Aster dumosus* f. *monocephalus* n. f.—Ernst A. Bessey.

6675. FORBES, CHARLES N. **New Hawaiian plants. VII.** Occasional Papers Bernice P. Bishop Mus. 7: 33-39. Pl. 3-11. 1920.—*Hibiscadelphus bombycinus*, *Viola kauaiensis* Gray var. *vahiauensis*, *Cyrtandra olona*, *C. hii*, *C. propinqua*, *C. Munroi*, *C. Georgiana*, *Clermontia Samuelii*, *Argyroxiphium caligini*, and *A. caligini* var. *Kai* are described as new to science.—H. F. Bergman.

6676. FORBES, CHARLES N., and GEORGE C. MUNRO. **A new Cyanea from Lanai, Hawaii.** Occasional Papers Bernice P. Bishop Mus. 7: 43. Pl. 12. 1920.—*Cyanea Baldwinii* sp. nov. is described.—H. F. Bergman.

6677. HITCHCOCK, A. S. **The grasses of Hawaii.** Mem. Bernice P. Bishop Mus. 8: 101-230. Pl. 31-35, fig. 1-110. 1922.—An introduction containing an account of the material examined is followed by a general discussion of the grasses characteristic of various habitats and a list of introduced species. Keys are given to the tribes, genera and species. Each species is described with synonymy and citation of Hawaiian specimens; figures are also given for a large number of them. At the end is a catalogue of specimens cited and a list of new species and new names. The following are described as new species: *Cenchrus Hillebrandianus*, *Eragrostis deflexa*, *E. leptophylla*, *E. mauiensis*, *Festuca hawaiiensis*, *Panicum Fauriei*, *P. Forbesii*, *P. kaalaense*, *P. kauaiense*. The following new combinations and new names are also included: *Poa sandvicensis* (*Festuca sandvicensis* Reichart), *Aira nubigena* (*Deschampsia nubigena* Hillebr.), *Calamagrostis Hillebrandii* (*Deyeuxia Hillebrandii* Munro), *C. expansa* (*Deyeuxia expansa* Munro), *Syntherisma chinensis* (*Paspalum chinensis* Nees), *S. microbachne* (*Panicum microbachne* Presl), *Panicum xerophilum* (*P. nephelophilum* γ var. *xerophilum* Hillebr.), *P. lanaiense* (*P. affine* Hook. & Arn., not Poir.), *P. Hillebrandianum* (*P. monticola* Hillebr., not Hook. f.), *Sacciolepis contracta* (*Panicum contractum* Wight & Arn.), *Ischaemum byrone* (*Spodiopogon byronis* Trin.).—H. F. Bergman.

6678. LAUTERBACH, C. **Die Guttiferen Papuasien.** [The Guttiferae of Papuasiasia.] Bot. Jahrb. 58: 1-49. 10 fig. 1922.—Under the general heading "Beiträge zur Flora von Papuasiasia, series IX, no. 80" the author treats the Guttiferae of this region, enumerating 66 species in 9 genera and giving keys as well as extensive bibliographical and distributional notes. Of the 9 genera 4 are endemic and of the 66 species, 61 are endemic. The largest genus is *Garcinia* with 42 species, 40 of which are endemic. Notes on exceptional or interesting species and genera are given. The following new species, forms, combinations, and names are proposed: *Hypericum Hellwigii* (*H. japonicum* Warbg. *H. Macgregorii* Lautb.), *Ochrocarpus papuanus*, *Calophyllum papuanum*, *C. Peckelii*, *C. Versteegii* (*C. Burmanni* Lautb.), *C. trachycaule*, *C. sil.*, *C. euryphyllum*, *Garcinia Holtrungii*, *G. squamata*, *G. Edelfeldtii* (*G. novo-guineensis* Vesque), *G. Moszkowskii*, *G. enthaematocides*, *G. tauensis*, *G. umbonata*, *G. Versteegi* (*G. aff. picrorhiza* Miq.), *G. sumbawensis*, *G. erythrosperma*, *G. nubigena*, *G. Klinkii*, *G. ramulosa*, *G. pallida*, *G. pachypetala*, *G. torensis*, *G. fruticosa*, *G. hygrophila*, *G. Ledermannii*, *G. assugu*, *G. oreophila*, *G. pallide-sanguinea*, *G. sabangensis*, *G. rupestris*, *G. tuberculata*, *G. maluensis*, *G. fusco-petiolata*, *G. Gjellerupii*, *G. Jaweri*, *G. Hunsteinii*, *G. Pullei*, *G. Schraderi*, *G. Schlechteri*, *Tripetalum cymosum* K. Schum. f. *pendula*, *Pentaphalangium latissimum* (?*Garcinia latissima* Miq.), *Cyclandra Ledermannii*, *C. papuana*. The genus *Cyclandra* is proposed as new.—K. M. Wiegand.

6679. MERRILL, E. D. New or noteworthy Bornean plants; part III. Jour. Malayan Branch Roy. Asiatic Soc. 1: 22-45. 1923.—The following new species are described: *Vaccinium Moultonii*, *Ardisia sublepidota*, *A. diversilimba*, *Rapanea multibracteata*. *Diospyros Jupii*, *Epigynum borneense*, *Willughbeia* (*Urnlaria*) *borneensis*, *Petraevitex membranacea*, *Callicarpa involucrata*, *Didymocarpus multinervia*, *Cyrtandra didissandriformis*, *C. longicarpa*, *C. simplex*, *Neonauclea longipedunculata*, *Hedyotis fissistipula*, *H. platyphylla*, *Urophyllum borneense*, *U. suberosum*, *Psychotria Woodii*, *P. grandistipula*, *Xanthophyllum longipedunculatum*, *Melothria diversifolia* and *Momordica acuminata*. New combinations are: *Willughbeia ovatifolia* (*Urnlaria ovatifolia* Stapf), *Pseudernathemum album* (*Justicia alba* Roxb., *Eranthemum album* Nees). New name: *Willughbeia Stapfii* (*Urnlaria oblongifolia* Stapf, not *Willughbeia oblongifolia* O. Ktz.). Twelve other species are mentioned, with localities.—R. E. Holttum.

6680. PARKER, R. N. A new species of *Astragalus* from Kumaon. Indian Forest. 49: 78-79. Pl. 5. 1923.—A full description of a new species, *Astragalus aegacanthoides*, is given.—E. N. Munns.

6681. PARKER, R. N. A new species of *Leptodermis*. Indian Forest. 48: 576-577. 1922.—A description is given of the new species *L. kumaonensis*, which is similar to both *L. lanceolata* Wall. and *L. Parkeri* Dunn.—E. N. Munns.

6682. PETCH, T. A new *Bulbophyllum*. Jour. Indian Bot. 3: 148-150. 12 fig. 1923.—*B. tricarinatum* is described as new, from the Maturata district, Ceylon.—Winfield Dudgeon.

6683. RIDLEY, H. N. A botanical excursion to northern Sumatra. Jour. Malayan Branch Roy. Asiatic Soc. 1: 46-113. 1923.—The mountain flora of the neighborhood of Berastagi is described, with an enumeration of about 490 species of vascular plants, including descriptions of 92 new species. A number of palaeartic genera common to the mountains of northern India and Java are found at Berastagi; a few of these are to be found also at 1 point in the Malay Peninsula (Telom, on the borders of Perak and Pahang) and it is considered probable that these Peninsula plants were derived from Sumatra and indicate a former land-connection between Sumatra and the Peninsula, and a former wider extension of the open type of vegetation in which they occur. Only 1 species of *Didymocarpus* is found at Berastagi, and palms are remarkably few as compared with similar situations on the Malay Peninsula. New species are: *Clematis sumatrana*, *Melodorum breviflorum*, *Saurauja roseata*, *Sterculia sumatrensis*, *Glycosmis sumatrana*, *Celastrus axillaris*, *Rhamnus sumatrensis*, *Rubus battakensis*, *Eugenia sulphurata*, *Melastoma vulcanicum*, *Oxydendron racemosum*, *Medinilla vulcanica*, *M. micrantha*, *Pachycentria scandens*, *Begonia Beccariana*, *B. flexula*, *Aralia Beccarii*, *Lonicera pulcherrima*, *Ophiorrhiza deflexa*, *O. exserta*, *O. subcrenata*, *Carlemannia sumatrana*, *Argostemma stellatum*, *A. corymbosum*, *A. triflorum*, *Mussaenda hirsuta*, *Mycetia angustifolia*, *Urophyllum grandifolium*, *U. macranthum*, *Petunga hirta*, *Stylocoryne sylvicola*, *Psychotria penduliflora*, *P. multinervia*, *Chasalia propinqua*, *Cephaelis pauciflora*, *Lasianthus* (*Mephitidia*) *vulcanicus*, *Blumea scabrifolia*, *Gynura aspera*, *Clethra pulcherrima*, *Ardisia* (*Pinelandra*) *megalocarpa*, *Labisia ovalifolia*, *Paysonia vulcanica*, *Hoya rhodostele*, *Dischidia polyphylla*, *Aeschynanthus fruticosus*, *Didymocarpus vulcanica*, *Rhynchosyche angustifolium*, *Cyrtandra pauciflora*, *C. pandurata*, *Strobilanthes hirticalyx*, *S. multiflora*, *S. anceps*, *Justicia virescens*, *Eranthemum sumatrense*, *Hypoestes tenuifolia*, *Callicarpa eriophylla*, *Clerodendron microcalyx*, *Pogostemon battakianum*, *Gomphostemma sumatrense*, *Thottea hirsuta*, *Piper* (*Cubeba*) *philodendron*, *P.* (*Eupiper*) *melanocarpum*, *P.* (*Eupiper*) *salicicola*, *P. coactile*, *Beilschmiedia sumatrensis*, *Trema lancifolia*, *Ficus inaequilatera*, *Oberonia elongata*, *Microstylis sumatrensis*, *Liparis pratensis*, *Ceratostylis scariosa*, *Dendrochilum lepidum*, *D. brevibracte*, *Calanthe unifolia*, *Goodyera casta*, *Hetaera grandiflora*, *Globba candida*, *Hedychium cylindricum*, *Amomum sumatrense*, *Hornstedtia Beccarii*, *Phaeomeria caudiculata*, *Musa sumatrana*, *Forrestia sumatrensis*, *F. porrecta*, *Pinanga parvula*, *Calamus karuensis*, *Homalomena Burkilliana*, *H.* (*Chamaecladon*) *obovata*, *Pothos paucinervis*, *Pandanus Burkillianus*, *Capillipedium scabridum*, *Erianthus decuss-sylvae*, and *Cyclophorus grandis*.—R. E. Holttum.

6684. SCHLECHTER, R. *Neue Orchidaceen Papuasiens*. [New orchids of Papuasiasia.] Bot. Jahrb. 58: 50-96. 1922.—Under the general heading "Beiträge zur Flora von Papuasien, series IX, no. 81" the author describes many new orchids of this region. This supplements a previous paper on the orchids of German New Guinea by the same author in 1914. Over 2,650 species are now known in Papuasiasia, which, in proportion to its area, makes this region the richest in orchids of any in the world even including the Cordillera States of South America. The number of large genera is remarkable: *Dendrobium* and *Bulbophyllum* contain more than 500 species and *Phreatia* more than 115. Several other genera are nearing the 100 mark, while at least 13 contain more than 20 species. The following species and varieties are proposed as new: *Corysanthes Ledermannii*, *Cryptostylis lancilabris*, *C. philippinensis*, *Lecanorchis bicarinata*, *Erythroides sepikana*, *Zeuxine leucotaenia* and var. *floribunda*, *Z. curvata*, *Microstylis dolichostachys*, *M. fulva*, *M. Ledermannii*, *M. petiolaris*, *M. Stolleana*, *M. vinosa*, *Oberonia elegans*, *O. Ledermannii*, *Liparis anceps*, *L. scleriifolia*, *Mediocalcar ericiflorum*, *M. sepikanum*, *Epiblastus Schultzii*, *Ceratostylis Bulbophylli*, *C. sphaerocephala*, *C. gracilicaulis*, *C. pinguis*, *C. tetrarioides*, *C. brachyphylla*, *C. heleocharis*, *C. tenuis*, *C. juncoides*, *Agrostophyllum sepikanum*, *A. congestum*, *A. cycloglossum*, *Glomera asperata*, *G. graminifolia*, *G. macrophylla*, *G. patens*, *G. Schultzii*, *Glossorrhyncha Hunsteiniana*, *G. Ledermannii*, *G. pteropetala*, *G. Schultzii*, *Giulianettia verrucosissima*, *G. fusca*, *G. inflata*, *Aglossorrhyncha stenophylla*, *Podochilus anguinus*, *P. falcipetalus*, *P. lancilabris*, *Appendicula sepikana*, *Cadetia cuneilabia*, *C. lactiflora*, *C. latoureoides*, *C. platyloba*, *C. quadriquetra*, *C. sepikana*, *Dendrobium lonchigerum*.—K. M. Wiegand.

6685. STANDLEY, PAUL C. *Diospyros Conzattii*, a new species of persimmon from Mexico. Jour. Washington [D. C.] Acad. Sci. 12: 399-400. 1922.

6686. STERRETT, W. D. A new oak from the Gulf States. Jour. Elisha Mitchell Sci. Soc. 37: 178-179. 1922.—The species described as *Quercus Ashei* is near the post oak, from which it differs mainly in narrower crown, more slender twigs, and much smaller fruit. It occurs in willow oak flats from Wood County, Texas, to Winn Parish, Louisiana.—W. C. Coker.

REVISIONS AND MONOGRAPHS

6687. ANONYMOUS. [Rev. of: PFEIFFER, NORMA E. Monograph of the Isoetaceae. Ann. Missouri Bot. Gard. 9: 79-232. 19 pl. 1922.] Nature 111: 443. 1923.

6688. BECCARI, ODOARDO. Asiatic palms—Lepidocaryeae. Part III. The species of the genera: *Ceratolobus*, *Calospatha*, *Plectocomia*, *Plectocomiopsis*, *Myrialepis*, *Zalacca*, *Pigafetta*, *Korthalsia*, *Metroxylon*, *Eugeissona*. Ann. Roy. Bot. Gard. Calcutta 12: 1-231. Pl. 1-6. 1918. IBID. Pl. 1-118. 1921.—Descriptions and illustrations of the following new species and combinations are included: *Ceratolobus rostratus* (*Korthalsia rostrata* Bl.), *Plectocomia billitonensis*, *P. Elmerii*, *P. bractealis*, *P. Kerrana*, *Plectocomiopsis dubius*, *Zalacca sumatrana*, *Z. Scortechinii*, *Korthalsia furcata*, *K. paucijuga*, *K. Merrillii*, *K. celebica*, *K. Rogersii*, *K. Hallieriana*, *K. macrocarpa*, *Metroxylon squarrosus*, *M. Warburgii* (*Coelococcus Warburgii* Heim), *M. upoluense*, *M. amicarum* (*Sagus amicarum* Wendl.), and *Eugeissona ambigua* (*E. tristis* Becc., not Griff.). Several new varieties are characterized. This volume also contains a conspectus of the genera of *Lepidocaryeae* and keys to the extra-Asiatic species of *Raphia*, *Ancistrophyllum*, *Oncocalamus*, *Eremospatha*, *Lepidocaryum*, and *Mauritia*. *Mauritia peruviana* is described as a new species from Peru. [See also Bot. Absts. 12, Entry 6692.]—J. M. Greenman.

6689. BECCARI, ODOARDO, AND JOSEPH F. ROCK. A monographic study of the genus *Pritchardia*. Mem. Bernice P. Bishop Mus. 8: 1-77. Pl. 1-24, fig. 1. 1921.—The monograph is divided into 2 parts. Part I deals with the distribution and characteristics of the genus *Pritchardia*. According to the authors "74 per cent of all the genus are endemic in the Hawaiian group." The fertilization and structural peculiarities of *Pritchardia* are discussed. This is followed by a discussion of the distribution of species by islands in the Hawaiian

group and the uses which the Hawaiians make of these palms. Part II is a systematic treatment. A conspectus of the species is presented followed by a detailed description of the species, of which there are 33 with several varieties. The following new species and varieties are described: *Pritchardia affinis* Becc. with vars. *holaphila*, *rhopalocarpa*, and *gracilis* Becc., *P. lanaiensis* Becc. & Rock, *P. glabrata* Becc. & Rock, *P. kaalae* Rock, *P. Forbesiana* Rock, *P. Lowreyana* Rock, *P. Lowreyana* var. *turbinata* Rock, *P. brevicalyx* Becc. & Rock, *P. Beccariana* Rock var. *Giffardiana* Becc., *P. Hardyi* Rock, *P. Munroii* Rock, *P. montis-kea* Rock, *P. viscosa* Rock, *P. kahanae* Rock & Caum, and *P. martioides* Rock & Caum.—H. F. Bergman.

6690. BROWN, N. E. The Cactus family. [Rev. of: BRITTON, N. L., and J. N. ROSE. The Cactaceae: descriptions and illustrations of plants of the Cactus family. Vol. 3. Carnegie Inst. Washington Publ. 248. Vol. 3. i-vii, 1-255. 24 pl. 1922.] Nature 111: 426-427. 1923.—This volume probably will appeal to a larger number of Cactus fanciers than the preceding ones as it deals chiefly with the smaller kinds which are more generally cultivated. It is unfortunate that such a name as "*Echinofossulocactus*" should come into use; the formation of such names might well be prohibited.—O. A. Stevens.

6691. FYSON, P. F. The Indian species of *Eriocaulon* (continued). Jour. Indian Bot. 3: 12-18, 91-115. Pl. 42-51. 1922.—Section VII, *Connato-sepalae*, with 1 species, and Section VIII, *Leucantherae*, with 5 species (*E. horsley-kundae* new) are described. Fifty-one species in all are recognized. Appendix I gives a list of 12 species which the author has not seen and has been unable to identify, and a list of species reduced from, restored to, changed, and new to Hooker's Flora of British India and Ruhland's Monograph. Appendix II gives a list of all the sheets of Indian species of *Eriocaulon* in the principal herbaria of India, and an index to the Indian species. [See also Bot. Absts. 11, Entry 4823.]—Winfield Dudgeon.

6692. [H., A. W.] Climbing palms and the sago palms. [Rev. of: BECCARI, ODOARDO. Asiatic palms—Lepidocarpaceae. Part III. The species of the genera: *Ceratolobus*, *Calospatha*, *Plectocomia*, *Plectocomiopsis*, *Myrialepis*, *Zalacca*, *Pigafetta*, *Korthalsia*, *Metroxylon*, *Euglossona*. Ann. Roy. Bot. Gard. Calcutta 12: 1-231. Pl. 1-6, 1918. Ibid. Pl. 1-118, 1921 (see Bot. Absts. 12, Entry 6688).] Nature 110: 372-373. 1922.

6693. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. VI. Part 8. P. 419-494, pl. 236-239. John Spence: Sydney, February, 1923.—The present part contains descriptions and illustrations of 4 previously published species and 6 species and 1 variety new to science, as follows: *Eucalyptus collina* Fitzgerald n. sp., *E. Flocktoniae* Maiden, *E. Shirleyi*, *E. Rummeryi*, *E. Herbertiana*, *E. comitae-vallis*, *E. longifolia* Link & Otto var. *multiflora*, *E. citriodora* Hooker, *E. hemiphloia* F.v.M., *E. microcarpa*, and *E. albens* Miquel. A chapter is included on the inflorescence.—J. M. Greenman.

6694. TUBEUF, KARL, VON. Monographie der Mistel. Roy. 8 vo, xii + 832 p., 35 pl., 179 fig., 6 maps. R. Oldenbourg: Munich and Berlin, 1923.—The author presents an exhaustive monograph of the true mistletoe, *Viscum album* L. The work is divided in 3 parts. The 1st part deals with the prehistoric occurrence of the mistletoe in Europe; the role of the mistletoe in the life of the people; the German, botanical, and common names of the mistletoe; the present geographical distribution. The 2nd part treats the morphology, anatomy, physiology, biology, and pathology of the mistletoe. The 3rd part takes up the role of the mistletoe in park, fruit, and forest trees. Of particular interest to the taxonomist is that portion of the work which concerns the detailed treatment of the geographical distribution.—J. M. Greenman.

6695. WATSON, E. E. The genus *Heliocarpus*. Bull. Torrey Bot. Club 50: 109-128. 1923.—A treatment is given of the genus *Heliocarpus* in which 22 species, and a possible 23rd, are recognized and for which diagnoses and distribution are given. *H. viridis*, *H. australis*, and *H. rudis* are described as new species.—P. A. Munz.

6696. YUNCKER, T. G. Revision of the South American species of *Cuscuta*. II. Amer. Jour. Bot. 10: 1-17. Pl. 1-5. 1923.—Of 14 species belonging to the subsection *Platycarpae* of the section *Clistogrammica*, *C. pentagona* var. *subulata* and *C. insquamata* are described as new.—E. W. Sinnott.

FLORISTICS AND PLANT DISTRIBUTION

6697. ANONYMOUS. Flore du Labrador. [Flora of Labrador.] Nat. Canadien 49: 183-186. 1923.—A list is given of over 130 species of Labrador plants, collected or observed in 1895 by Abbé P. Lemay.—A. H. MacKay.

6698. ASHE, W. W. Azalea in North Carolina. Jour. Elisha Mitchell Sci. Soc. 38: 90-91. 1922.—A key is given to the 13 species recognized from the eastern U. S. A., 8 of them occurring in North Carolina; in addition, 10 varieties are noted. There is appended a note on the distribution of *Rhododendron* in which the variety *Margarettae* of *R. carolinianum* is raised to specific rank.—W. C. Coker.

6699. ASHE, W. W. The eastern shrubby species of *Robinia*. Jour. Elisha Mitchell Sci. Soc. 37: 175-177. 1922.—A key is given of the 9 eastern shrubby species of the genus, including *R. margaretta* and *R. grandiflora*, which are described as new. *Robinia Hardwegii* Koeh. is reduced to a variety of *R. viscosa*.—W. C. Coker.

6700. BEAUVERD, G. Nouvelles acquisitions pour la florule phanérogamique Genevoise. [New acquisitions to the phanerogamic flora of Geneva.] Bull. Soc. Bot. Genève 13: 38-39. 1921.—The author describes *Stachys annua* L. var. *glareosa* as a new variety, and also characterizes 3 new subvarieties of *Prenanthes purpurea* L. var. *genuina* Bvrd.—J. M. Greenman.

6701. BEAUVERD, G. Résumé des herborisations aux marais de Sionnet-Rouelbeau (Genève), la plage des "Crenees" et les bois de Tanney-Mies (Vaud). [Résumé of a collection of plants from the swamps of Sionnet-Rouelbeau (Geneva) in the vicinity of "Crenees" and the forests of Tanney-Mies (Vaud).] Bull. Soc. Bot. Genève 12: 131-136. 1920.—The author lists noteworthy plants collected in certain bogs and forests of Switzerland.—W. H. Emig.

6702. BEAUVERD, G. Sur la flore vasculaire des environs de Modane, de Bardonnèche et de Suze (Massif du Cenis). [The vascular flora in the vicinity of Modana, Bardonnecchia, and Susa (Mont Cenis).] Bull. Soc. Bot. Genève 13: 115-184. 1921.—This article consists of a summary of a number of field trips including descriptions of the following new varieties and subspecies: *Pulsatilla alpina* Schrank var. *Cottianaea* Bvrd., *Ranunculus geraniifolius* Pourret subsp. *Cottianaeus* Bvrd., *Capsella Bursa-pastoris* (L.) Medic. var. *pulchella* Bvrd. & Guyot, *Linum alpinum* L. var. *praecox* Bvrd., and *Viola silvestris* Lam. var. *Cottianaea* Bvrd. The mountain and alpine plants make up 38.5 per cent of the total number of species found, xerophytic plants, 35 per cent, mesophytic plants, 14.5 per cent, and hygrophytic species, 12 per cent.—W. H. Emig.

6703. BERTSCH, K. Neue Gefässpflanzen unserer Flora. [New vascular plants of our flora.] Jahresh. Ver. Vaterländ. Naturk. Württemberg 76: 62-75. 3 fig. 1920.—As a result of recent explorations the author records the following species and hybrids as additions to the flora of Württemberg: *Equisetum trachyodon* A. Br., *Typha minima* Fek., *Potamogeton filiformis* Pers., *P. panormitanus* Bivona, *Calamagrostis arundinacea* × *epigeios*, *Festuca capillata* Lam., *Carex polygama* Schkuhr, *C. Hornschuchiana* × *lepidocarpa*, *C. Hornschuchiana* × *Oederi*, *Hemerocallis flava* L., *Gladiolus communis* L., *Thalictrum exaltatum* Gaud., *Aconitum Stoerkianum* Reichenb., *Corydalis ochroleuca* Koch., and *Aster lanceolatus* Willd. Each is accompanied by descriptive notes and by data on distribution. The figures represent the floral parts of the hybrid *Calamagrostis* and of the 2 parental species.—A. W. Evans.

6704. BESSEY, E. A. *Nymphaea microphylla* in Michigan. Papers Michigan Acad. Sci. 1: 59-60. 1923.—*Nymphaea microphylla* Pers. was found in 1920 in Gogebic County, the westernmost county of the Upper Peninsula of Michigan. This may throw light on the possible hybrid nature of *N. rubrodisca*, which is now shown to coincide in its range with *N. microphylla*.—Ernst A. Bessey.

6705. CHODAT, R. La végétation du Paraguay. XI. Borraginacées. [The vegetation of Paraguay. XI. Borraginaceae.] Bull. Soc. Bot. Genève 12: 157-171. Fig. 304-312. 1920.—The family Borraginaceae is represented by many species of *Heliotropium*, and *Tournefortia*. *H. curassavicum* L. occurs in waste places of coarse sand, and *H. inundatum* Sw. is found on the banks of lagoons. Ruderal species include *H. europaeum* and *H. indicum* L.; and in the woods and underbrush many forms of *H. monostachyum* DC. and *H. monostachyum* var. *tiaridioides* Cham. are represented. *Tournefortia laevigata* Lam. is common in similar situations. The genus *Cordia* is represented by a large number of trees. The structure of the flowers and leaves of certain species of *Cordia* is illustrated. [See also Bot. Absts. 11, Entry 3212.]-W. H. Emig.

6706. DANZIG, E. Beiträge zur Kenntnis der Phanerogamenflora des sächsischen Vogtlandes. [Contributions to the knowledge of the phanerogamic flora of the Saxon Vogtland.] Sitzungsber. u. Abhandl. Naturw. Ges. "Isis" 1920-21: 1-10. 1922.—The author records the more important results of his explorations during 1919-21 in the Vogtland, a district in the southern part of Saxony. He enumerates 96 species and hybrids of greater or less rarity, designating 24 as new to the region and 1, the hybrid *Anthemis arvensis* × *tinctoria*, as new to Saxony. Each species is accompanied by data regarding stations, and many descriptive or critical notes are included.—A. W. Evans.

6707. DARLINGTON, H. T. Contributions to the flora of Gogebic County, Michigan. Part I. Rept. Michigan Acad. Sci. 22: 147-176. 1921.—Gogebic County is the westernmost county of the Upper Peninsula of Michigan. Part is hilly and well drained, part is low and swampy; lakes are very abundant. Much of the area is covered with virgin hardwood timber. The plants collected in August, 1919, number 38 ferns and fern allies, 10 conifers, 143 monocotyledons, including 52 grasses and 35 sedges, and 316 dicotyledons, including 58 composites (in the wider sense of the term). Of the 316 dicotyledons, 65 were woody in whole or at least in part.—Ernst A. Bessey.

6708. DARLINGTON, H. T. Contributions to the flora of Gogebic County, Michigan. Part II. Papers Michigan Acad. Sci. 1: 74-82. 1923.—Collections made in the early part of the summer of 1920 added the following to the vascular flora of this county: 2 ferns (total 40); 43 monocotyledons (total 186) including 9 grasses (total 61) and 21 sedges (total 56); and 59 dicotyledons (total 375) including 5 composites (total 63). The 9 additional woody plants bring the total of woody plants up to 74 out of the total of 601 vascular plants.—Ernst A. Bessey.

6709. DIELS, L. Eine *Scaevola* von Mikronesien. [A *Scaevola* from Micronesia.] Bot. Jahrb. 56: 561. 1921.—This is no. 20 of the series: Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. *Scaevola frutescens* (Mill.) Krause is reported from the Caroline and Marshall Islands.—K. M. Wiegand.

6710. GUYOT, HENRY. L'ancienne extension des forêts dans la région du Grand St-Bernard (Valais). [The ancient extension of the forests in the region of Grand St. Bernard (Valais).] Bull. Soc. Bot. Genève 12: 152-153. 1920.—*Pinus Cembra* L. occurred in the region of St. Bernard previous to the 17th century.—W. H. Emig.

6711. LENDNER, A., ET G. BEAUVERD. L'*Erica vagans* L. du territoire Genevois. [*Erica vagans* L. of the Geneva region.] Bull. Soc. Bot. Genève 13: 30. 1921.

6712. McATEE, W. L. Notes on interesting plants in Michigan. Papers Michigan Acad. Sci. 1: 155-166. 1923.—Here are published notes on various plants representing forms little known or that are additions to the known flora of Michigan, based on an annotated copy of Beal and Wheeler's Michigan Flora which was the property of the late Professor C. F. Wheeler, and upon letters and specimens enclosed in that copy.—*Ernst A. Bessey.*

6713. PRAEGER, R. LLOYD. Notes on Antrim plants. Irish Nat. 29: 95-105. 1920.—These notes concern chiefly the local distribution of plants in County Antrim, Ireland.—*W. E. Praeger.*

6714. PRAEGER, R. LLOYD. Notes on Down and Dublin plants. Irish Nat. 30: 101-103. 1921.—Sundry observations on habits and distribution are recorded.—*W. E. Praeger.*

6715. REBHOLZ, E. Beiträge zur Wildrosenflora des oberen Donautales und seiner Umgebung I. [Contributions to the wild rose flora of the upper valley of the Danube and vicinity. I.] Jahresh. Ver. Vaterländ. Naturk. Württemberg 78: 20-34. 1922.—The district studied is in the southern part of Württemberg and includes Tuttlingen and the surrounding country. The author describes the general appearance of the rose flora among the other elements of the vegetation and discusses in detail the local distribution of the individual species. In this, the 1st part of his work, he takes up the sections *Synstylae*, *Gallicae*, and *Caninae*. The 1st is represented by 1 species, *Rosa arvensis* Huds. (with 4 varieties); the 2nd, also by 1 species, *R. gallica* L.; while the 3rd is represented by 12 species (distributed among 5 subsections as follows: *R. Jundzillii* Besser (with 2 subspecies), *R. rubrifolia* Villars (with 3 varieties, the var. *Rebholzii* R. Keller being described as new), *R. pomifera* Herrmann (with 1 variety), *R. tomentosa* Sm. (with 4 varieties), *R. rubiginosa* L. (with 3 varieties), *R. micrantha* (with 1 variety), *R. agrestis* Savi (with 1 variety), *R. tomentella* Leman, *R. canina* L. (with 5 varieties) *R. dumetorum* Thuiller (with 4 varieties), *R. glauca* Villars (with 6 varieties), and *R. coriifolia* Fr. (with 4 varieties, the var. *atra* R. Keller & E. Rebholz being described as new). Critical and descriptive remarks are given in connection with many of the species and varieties.—*A. W. Evans.*

6716. ROMIEUX, HENRI. Remarques sur deux plantes du Maroc. [Remarks on two Moroccan plants.] Bull. Soc. Bot. Genève 13: 30. 1921.—At an elevation of 1400 m., near Geneva, were found 2 plants of special interest: *Asphodelus acaulis* Desf., and *Boucerosia* sp.—*W. H. Emig.*

6717. SCHLENKER, K. Über 2 Adventivpflanzen in der württ. Flora. [On 2 adventive plants in the flora of Württemberg.] Jahresh. Ver. Vaterländ. Naturk. Württemberg 78: xxvii-xxix. 1922.—A report of a meeting is given in which the discovery of *Senecio vernalis* and *Bidens radiatus* in Württemberg was announced. The 1st is a native of Central Asia and Russia, the 2nd of southeastern Siberia. Both species are widely introduced into other parts of western Europe.—*A. W. Evans.*

6718. SMITH, E. PHILLIP, AND JOHN B. SIMPSON. *Spiranthes autumnalis*. Nature 111: 291. 1923.—Two separate notes are recorded on the occurrence of this orchid at Carrbridge and on the Island of Coll, Argyllshire.—*O. A. Stevens.*

6719. SOTH, BLANCHE H. Flora of Pocatello, Idaho. Amer. Bot. 29: 48-53. 1923.—The seasonal aspect of the flora of this region is discussed.—*S. P. Nichols.*

6720. STELFOX, A. W. Note on *Carex muricata* L. and its segregates *C. contigua* Hoppe and *C. Pairaei* Schultz. Irish Nat. 30: 31-32. 1921.

6721. THOMPSON, BERTHA E. Distribution of the Violaceae of Michigan. Papers Michigan Acad. Sci. 1: 167-184. Pl. 35-36. 1923.—A list, based on specimens examined, is

given of the Violaceae occurring in Michigan, together with a key for their determination. One species of *Cubelium* and 34 of *Viola* are recognized in the state.—*Ernst A. Bessey*.

6722. TOTTEN, H. R. Wild ferns and flowers of Chapel Hill. Jour. Elisha Mitchell Sci. Soc. 38: 12. 1922.—*Tradescantia virginiana* L. and *Silene alba* Muhl. are added to the list of Chapel Hill (North Carolina) species.—*W. C. Coker*.

6723. TURRILL, W. B. *Convolvulus nitidus* Boiss., from the Balkan Peninsula. New Phytol. 22: 95-96. 1923.—The species named, known hitherto only from the mountains of southern Spain, is here reported from a similar locality (Mt. Ali-Botusch) in the Balkans.—*I. F. Lewis*.

6724. VOIGT, ALBAN. Beiträge zur Floristik des Tessins. II. [Contributions to the flora of Tessin. II.] Sitzungsber. u. Abhandl. Naturw. Ges. "Isis" 1920-21: 11-19. 1922.—The author reports the results of his 1921 explorations in the southern part of the canton of Tessin, Switzerland. He describes the physiographic and geological features of the district and comments on the large number of adventive plants in the flora, many of these having been introduced with Italian hay in 1919. The rare and otherwise interesting vascular plants collected are enumerated and number 91 species, varieties, and forms, 46 of which are new to the canton. Each species is accompanied by data regarding localities, and a few descriptive or distributional notes are given. A new variety, *Stachys Ocymastrum* var. *purpureiflorus* Thell., and a new form, *Sisymbrium Loeselii* f. *pallidiflorum* Voigt, are described. *A. W. Evans*.

6725. WINSTEDT, K. Farve-Vaid (*Isatis tinctoria* L.) vildtvoksende i Danmark. [*Isatis tinctoria* naturally growing in Denmark.] Nat. Verden 6: 33-36. 1922.—*Isatis tinctoria* L. var. *maritima* Rupr. was found in 1919 and 1920 on the island of Bornholm in the Baltic, where it was discovered in 1861, although absent in the meantime. It appears to have come from the Swedish coast where it grows spontaneously. The seed float on salt water 4-6 days. The plant was never much cultivated in Denmark, the localities are very few, and the occurrence may always be connected with import of foreign grass seed.—*Ernst Gram*.

6726. YUNCKER, T. G. The genus *Cuscuta* in Michigan. Papers Michigan Acad. Sci. 1: 185-189. 1923.—A list is given with key of the 8 species of *Cuscuta* occurring in Michigan, based upon specimens examined by the author.—*Ernst A. Bessey*.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

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6727. AMANN, J. L'étude der mousses au microscope polarisant. [The study of mosses by means of a polarizing microscope.] Rev. Bryologique 50: 6-9. 1923.—The author presents some of the results obtained by the use of a polarizing microscope in the study of the leaves, peristomes, and other parts of mosses. He distinguishes between positive and negative effects, and brings out the fact that the optical properties of the cell-membranes depend upon chemical composition.—*A. W. Evans*.

6728. BADE, E. Between two worlds. Sci. Amer. 128: 34. 4 fig. 1923.—This article points out the various difficulties encountered in attempting to differentiate lower plants and lower animals, when employing the criteria of function and behavior.—*Chas. H. Otis*.

6729. BAILEY, VERNON. Sources of water supply for desert animals. Sci. Monthly 17: 66-86. 1923.—Some rabbits eat the prickley pear, *Opuntia Engelmanni*, and parts of even more spiny cacti. *Talinum* is also used. Rats, gophers, ground squirrels, and grasshopper

mice may use very little or no water, except that obtained from plants. Even man may live with a small amount, if he knows the plants to use and becomes accustomed to the conditions.—*L. Pace.*

6730. EWART, ALFRED J. **Biology during the war and after.** Rept. Australasian Assoc. Adv. Sci. 15: 134-144. 1921.—This is the President's address before Section D of Australasian Association for the Advancement of Science. It contains a short address on the value of botany as a science, followed by reports of recent Australasian researches in botany and zoology and by a short review of the work done at the National Herbarium of Victoria during the past 15 years.—*Ray C. Friesner.*

6731. FERRIS, G. F. **The place of the systematist in modern biology.** Sci. Monthly 16: 514-520. 1923.—The work of the systematist is not only for his own field; all other biologists depend on it. It should have the best minds, and not be left for amateurs.—*L. Pace.*

6732. GREER, W. C. **Black gold of the Tropics.** Pharm. Era 56: 215-218. 2 fig. 1923.—A description is given of the processes through which rubber passes in the manufacture of various articles.—*C. M. Sterling.*

6733. KÖHLER, A. **Das Mikroskop und seine Anwendung.** [The microscope and its uses.] Abt. II. Physikalische Methoden. Heft 2. Lieferung 95 of the **Handbuch der biologischen Arbeitsmethoden.** [Vol. II. Physical methods. Heft 2. Part 95 of the **Handbook of biological laboratory methods.**] P. 171-352. Fig. 138-248. Urban and Schwarzenberg: Berlin and Vienna, 1923. Edited by EMIL ABDERHALDEN.—The subject is treated under the following heads: geometrical relation between object and image; application of the law of images to lenses of definite thickness, or to a system of such lenses; remarks on photometry; photometrical relation between object and image; loss of light in optical systems; remarks concerning seeing with the unaided eye. Pages 237-286 are devoted to the hand lens, with the following sections: the formation of a level field through the magnifier; the imaging of a body through the magnifier; the imaging of an illuminated transparent or reflecting preparation; image defects of the magnifier and their improvement; different forms of magnifiers. Pages 286-352 deal with the simple microscope, with sections as follows: the imaging of a plane object by the simple microscope; the imaging of illuminated transparent objects; image defects of simple microscopes and their improvement; a few forms of the simple microscope; mountings and stands of the simple microscope; testing the magnifier and the simple microscope and measuring the magnification.—*C. S. Gager.*

6734. MANGHAM, SIDNEY. **Laboratory Notes. A simple respiroscope. A cheap bench light.** New Phytol. 21: 230-231. 1922.

6735. MAWSON, DOUGLAS. **Australasian Antarctic expedition. Report on progress of publication of scientific results.** Rept. Australasian Assoc. Adv. Sci. 15: 286-291. 1921.

6736. NORMAN, J. R. **Methods and technique of reconstruction.** Jour. Roy. Microsc. Soc. London 1923: 37-56. 8 fig. 1923.—A method of reconstructing objects in wax from serial sections is described.—*R. E. Cleland.*

6737. SLOSSON, EDWIN E. **Current comment.** Sci. Monthly 16: 557. 1923.—Power in large quantities may be obtained from the fruit of prickly pears.—*L. Pace.*

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FOR EDITORIAL AND BUSINESS NOTICES, SEE THIRD COVER PAGE

CONTENTS

Agronomy.....	1-120
Bibliography, Biography and History.....	121-172
Botanical Education.....	173-180
Cytology.....	181-202
Ecology and Plant Geography.....	203-333
Forest Botany and Forestry.....	334-400
Genetics.....	401-423
Horticulture.....	424-536
Morphology, Anatomy and Histology of Vascular Plants.....	537-540
Morphology and Taxonomy of Algae.....	541-561
Morphology and Taxonomy of Bryophytes.....	562-587
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	588-605
Paleobotany and Evolutionary History.....	606-628
Pathology.....	629-713
Pharmaceutical Botany and Pharmacognosy.....	714-730
Physiology.....	731-847
Soil Science.....	848-884
Taxonomy of Vascular Plants.....	885-932

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CONTENTS

Agronomy.....	933-1002
Bibliography, Biography and History.....	p. 154
Botanical Education.....	1003-1013
Cytology.....	p. 155
Ecology and Plant Geography.....	p. 156
Forest Botany and Forestry.....	1014-1027
Genetics.....	1028-1068
Horticulture.....	1069-1105
Morphology, Anatomy and Histology of Vascular Plants.....	1106-1125
Morphology and Taxonomy of Algae.....	1126-1129
Morphology and Taxonomy of Bryophytes.....	1130-1134
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	1135-1206
Paleobotany and Evolutionary History.....	1207-1219
Pathology.....	1220-1365
Pharmaceutical Botany and Pharmacognosy.....	1366-1396
Physiology.....	1397-1509
Soil Science.....	p. 250
Taxonomy of Vascular Plants.....	p. 250
Miscellaneous, Unclassified Publications.....	1510-1531

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CONTENTS

Agronomy.....	1532-1615
Bibliography, Biography and History.....	1616-1653
Botanical Education.....	1654-1668
Ecology and Plant Geography.....	p. 270
Forest Botany and Forestry.....	1669-1758
Genetics.....	1759-1831
Horticulture.....	1832-1922
Morphology, Anatomy and Histology of Vascular Plants.....	p. 308
Morphology and Taxonomy of Algae.....	1923-1935
Morphology and Taxonomy of Bryophytes.....	1936-1949
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	1950-2007
Paleobotany and Evolutionary History.....	2008-2020
Pathology.....	2021-2068
Pharmaceutical Botany and Pharmacognosy.....	2069-2077
Physiology.....	2078-2151
Soil Science.....	2152-2168
Taxonomy of Vascular Plants.....	2169-2224

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FOR EDITORIAL AND BUSINESS NOTICES, SEE THIRD COVER PAGE

CONTENTS

Agronomy.....	2225-2282
Bibliography, Biography and History.....	2283-2297
Botanical Education.....	2298-2308
Cytology.....	p. 377
Ecology and Plant Geography.....	2309-2349
Forest Botany and Forestry.....	2350-2399
Genetics.....	2400-2459
Horticulture.....	2460-2496
Morphology, Anatomy and Histology of Vascular Plants.....	2497-2518
Morphology and Taxonomy of Algae.....	p. 420
Morphology and Taxonomy of Bryophytes.....	2519-2536
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	2537-2556
Paleobotany and Evolutionary History.....	2557-2563
Pathology.....	2564-2700
Pharmaceutical Botany and Pharmacognosy.....	2701-2716
Physiology.....	2717-2820
Soil Science.....	2821-2841
Taxonomy of Vascular Plants.....	2842-2884
Miscellaneous, Unclassified Publications.....	2885-2899

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CONTENTS

Agronomy.....	2900-2960
Bibliography, Biography and History.....	2961-2977
Botanical Education.....	2978-2987
Cytology.....	p.
Ecology and Plant Geography.....	2988-3040
Forest Botany and Forestry.....	3041-3099
Genetics.....	3100-3293
Horticulture.....	3294-3360
Morphology, Anatomy and Histology of Vascular Plants.....	3361-3370
Morphology and Taxonomy of Algae.....	p.
Morphology and Taxonomy of Bryophytes.....	3371-3385
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	3386-3408
Paleobotany and Evolutionary History.....	3409-3420
Pathology.....	3421-3458
Pharmaceutical Botany and Pharmacognosy.....	3459-3463
Physiology.....	3464-3573
Soil Science.....	3574-3580
Taxonomy of Vascular Plants.....	3581-3639
Miscellaneous, Unclassified Publications.....	3640-3649

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CONTENTS

Agronomy.....	3650-3725
Bibliography, Biography and History.....	3726-3785
Botanical Education.....	3786-3813
Cytology.....	p. 645
Ecology and Plant Geography.....	3814-3889
Forest Botany and Forestry.....	3890-3952
Genetics.....	3953-4027
Horticulture.....	4028-4117
Morphology, Anatomy and Histology of Vascular Plants.....	4118-4159
Morphology and Taxonomy of Algae.....	4160-4163
Morphology and Taxonomy of Bryophytes.....	4164-4180
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	4181-4241
Paleobotany and Evolutionary History.....	4242-4257
Pathology.....	4258-4437
Pharmaceutical Botany and Pharmacognosy.....	4438-4452
Physiology.....	4453-4603
Soil Science.....	4604-4626
Taxonomy of Vascular Plants.....	4627-4702
Miscellaneous, Unclassified Publications.....	4703-4717

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FOR EDITORIAL AND BUSINESS NOTICES, SEE THIRD COVER PAGE

CONTENTS

Agronomy.....	4718-4755
Bibliography, Biography and History.....	4756-4781
Botanical Education.....	4782-4802
Cytology.....	4803-4849
Ecology.....	4850-4904
Forest Botany and Forestry.....	p. 814
Genetics.....	4905-4993
Horticulture.....	4994-5028
Morphology, Anatomy and Histology of Vascular Plants.....	5029-5040
Morphology and Taxonomy of Algae.....	p. 838
Morphology and Taxonomy of Bryophytes.....	5041-5048
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	5049-5100
Paleobotany and Evolutionary History.....	5101-5115
Pathology.....	5116-5144
Pharmaceutical Botany and Pharmacognosy.....	5145-5166
Physiology.....	5167-5257
Soil Science.....	5258-5273
Taxonomy of Vascular Plants.....	p. 879
Miscellaneous, Unclassified Publications.....	5274-5283

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The indexes will be offered for subscription within a few days. Subscribers will receive notice and an order blank in ample time to take advantage of a special reduced subscription price. Non-subscribers who desire a copy of the notice are requested to communicate at once with the Business Manager.

Subscribers are reminded that the early volumes were sold on the basis of a book of 300-325 pages. It was planned, at the outset, to publish annual subject indexes; but when a variety of circumstances made this impossible the volumes were filled up with abstracts and author indexes. Upon examination it will be found that the first 10 volumes average 311.4 pages each.

Price. It is estimated that the subscription price for the indexes will be \$10. If a great many non-subscribers desire a copy it may be possible to reduce the price somewhat. The post-publication price will be much higher than the subscription price.

Index for volume eleven. Subscribers to Botanical Abstracts are reminded that the index for volume 11 is in preparation and that its cost is included in the subscription price for that volume.

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FOR EDITORIAL AND BUSINESS NOTICES, SEE THIRD COVER PAGE

CONTENTS

Agronomy.....	5284-5331
Bibliography, Biography and History.....	5382-5411
Botanical Education.....	5412-5420
Cytology.....	5421-5450
Ecology.....	5451-5484
Forest Botany and Forestry.....	5485-5594
Genetics.....	5595-5637
Horticulture.....	5638-5734
Morphology, Anatomy and Histology of Vascular Plants.....	5735-5754
Morphology and Taxonomy of Algae.....	p. 952
Morphology and Taxonomy of Bryophytes.....	5755-5770
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	5771-5809
Paleobotany and Evolutionary History.....	5810-5814
Pathology.....	5815-5904
Pharmaceutical Botany and Pharmacognosy.....	5905-5918
Physiology.....	5919-6007
Soil Science.....	6008-6035
Taxonomy of Vascular Plants	6036-6131

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INDEX TO VOLUME 12

The December (concluding) number of Volume 12 will be devoted to the author and subject indexes for the volume. This volume, therefore, should not be bound until the number, which will be considerably delayed, is received. Meanwhile publication of Volume 13 (1924) will proceed. The cost of the index number of Volume 12 is included in the subscription price for that volume.

[INDEX TO VOLUME 11

This index (concluding number of Volume 11, 1922) is in preparation and will be distributed at the earliest possible time. Its cost is included in the subscription price for the volume.

CUMULATED INDEX TO VOLUMES 1 TO 10

Cumulated subject and author indexes of Botanical Abstracts, volumes 1 to 10, are ready to print. The author index contains about 26,000 citations while the subject index has 60,000 entries with perhaps 3 or 4 times as many citations. All topics mentioned in the abstracts are suitably indexed. For a sample page, see cover page 4 of this issue. The completed work will comprise a volume of about 500 pages.

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FOR EDITORIAL AND BUSINESS NOTICES, SEE THIRD COVER PAGE

CONTENTS

Agronomy.....	6132-6202
Bibliography, Biography and History.....	6203-6215
Botanical Education.....	6216-6226
Cytology.....	6227-6233
Ecology.....	6234-6254
Forest Botany and Forestry.....	6255-6313
Genetics.....	6314-6368
Horticulture.....	6369-6452
Morphology, Anatomy and Histology of Vascular Plants.....	6453-6465
Morphology and Taxonomy of Algae.....	6466-6482
Morphology and Taxonomy of Bryophytes.....	6483-6487
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	6488-6510
Paleobotany and Evolutionary History.....	6511-6515
Pathology.....	6516-6600
Pharmaceutical Botany and Pharmacognosy.....	6601-6607
Physiology.....	6608-6642
Soil Science.....	6643-6645
Taxonomy of Vascular Plants.....	6646-6726
Miscellaneous, Unclassified Publications.....	6727-6737

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